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NAVAL POSTGRADUATE SCHOOL MONTEREY, CALIFORNIA



THESIS

ACOUSTICALLY FORCED HEAT TRANSFER FROM A TUBE BANK

by

Gabriel A. Lowe

June 2000

Thesis Advisor:

Ashok Gopinath

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ACOUSTICALLY FORCED HEAT TRANSFER FROM A TUBE BANK

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Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MECHANICAL ENGINEERING

from the

**NAVAL POSTGRADUATE SCHOOL
June 2000**

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ABSTRACT

Experimental work was carried out on the steady state heat transfer behavior from a tube bank in a zero mean oscillatory flow. The oscillatory flow across the tube bank was created by an acoustic field inside an isolated resonant chamber. The transverse tube bank arrangement was represented by smooth walled cylinders placed parallel to each other, with the plane of the cylinders normal to the direction of fluid oscillation, similar to the arrangement found in many heat exchangers. The spacing between the cylinders was varied to examine the effects of boundary layer interference on the heat transfer behavior. Heat transfer correlations were developed in the form of Nusselt number as a function of the streaming Reynolds number for each tube spacing. This experimental study is relevant to the design of heat exchangers for thermoacoustic engines.

TABLE OF CONTENTS

| | |
|--|----|
| I. INTRODUCTION | 1 |
| II. BACKGROUND..... | 3 |
| A. ACOUSTIC FIELDS | 3 |
| B. THERMOACOUSTIC REFRIGERATION..... | 4 |
| C. BOUNDARY LAYERS | 6 |
| III. EXPERIMENT | 9 |
| A. INTENT | 9 |
| B. DIMENSIONLESS PARAMETERS | 9 |
| 1. Cylinder Length Scale | 10 |
| 2. Amplitude Parameter | 11 |
| 3. Frequency Parameter | 11 |
| 4. Interference Parameter..... | 12 |
| 5. Streaming Reynolds Number..... | 13 |
| C. APPARATUS | 14 |
| 1. Sound Chamber | 14 |
| 2. Tube Bank..... | 15 |
| 3. Electronic Instruments Package..... | 16 |
| D. PROCEDURE..... | 19 |
| IV. RESULTS AND DISCUSSION..... | 23 |
| V. CONCLUSIONS AND RECOMMENDATIONS | 31 |
| APPENDIX..... | 33 |
| A. SAMPLE CALCULATIONS | 33 |
| 1. Nusselt Number | 33 |
| 2. Streaming Reynolds Number..... | 34 |
| B. UNCERTAINTY ANALYSIS | 35 |
| 1. Nusselt Number | 35 |
| 2. Streaming Reynolds Number..... | 35 |
| C. EXPERIMENTAL DATA..... | 37 |
| LIST OF REFERENCES | 85 |
| INITIAL DISTRIBUTION LIST | 87 |

LIST OF FIGURES

| | |
|--|----|
| 1. Resonate Standing Acoustic Wave in an Isolated Chamber | 4 |
| 2. Thermoacoustic Refrigerator | 6 |
| 3. Heat Exchanger | 7 |
| 4. Boundary Layers on Cylinders in Cross Flow | 8 |
| 5. Experimental Sound Chamber | 14 |
| 6. Tube Bank | 15 |
| 7. Heater Circuit | 17 |
| 8. Instruments Schematic | 18 |
| 9. Photograph of Experimental Apparatus | 18 |
| 10. Geometry for Maximum Velocity at Tube Bank | 20 |
| 11. Nusselt Number vs. Streaming Reynolds Number for $S_T/d=1.5$ | 25 |
| 12. Nusselt Number vs. Streaming Reynolds Number for $S_T/d=1.75$ | 26 |
| 13. Nusselt Number vs. Streaming Reynolds Number for $S_T/d=2.0$ | 27 |
| 14. Nusselt Number vs. Streaming Reynolds Number for all $\phi>1$ | 28 |
| 15. Nusselt Number vs. Streaming Reynolds Number for $ST/d=1.25$ | 30 |

LIST OF TABLES

| | |
|---|----|
| 1. Resonate Frequencies Used | 19 |
| 2. Parameter Ranges Used | 23 |
| 3. Correlation Data for $\varphi > 1$ | 25 |

LIST OF SYMBOLS

| | |
|---------------|---|
| χ | cylinder compactness parameter |
| δ | boundary layer thickness [m] |
| ΔT | temperature difference [K] |
| ε | amplitude parameter |
| γ | specific heat ratio |
| ϕ | interference parameter |
| λ | wavelength [m] |
| λ_R | radian wavelength [m] |
| Λ | frequency parameter |
| ν | kinematic viscosity [m ² /s] |
| ω | radian frequency [rad/s] |
| ζ | surface-to-surface tube bank spacing [m] |
| A_H | heater cross sectional area [m ²] |
| c | speed of sound [m/s] |
| d | cylinder diameter [m] |
| f | frequency [Hz] |
| G | amplitude gain |
| G_R | Grashoff number |
| h | convection heat transfer coefficient [W/m ² K] |
| I_H | heated cylinder current [A] |
| I_R | resistor current [A] |
| k_{air} | thermal conductivity of air [W/mK] |
| L | tube-bank to chamber-end distance [m] |
| L_H | heated cylinder length |
| Nu_d | Nusselt number based on diameter |
| P_m | mean ambient pressure [Pa] |
| P_o | pressure level [Pa] |
| Pr | Prandtl number |
| Q_H | heated cylinder power [W] |
| r | cylinder radius [m] |
| R_{air} | gas constant for air [J/kg K] |
| R_R | resistor resistance [Ω] |
| R_S | Streaming Reynolds number |
| S | transducer sensitivity [mV/psi] |
| S_T | center-to-center tube bank spacing [m] |
| T_A | ambient temperature [K] |
| T_{avg} | average fluid temperature [K] |
| T_H | heated cylinder temperature [K] |
| V_H | heated cylinder voltage [V] |
| V_{mic} | transducer voltage [mV] |
| V_R | resistor voltage [V] |

I. INTRODUCTION

The influence of sound waves in the transfer of heat is a relatively new science. A recent application of acoustic heat transfer is relevant to the design of heat exchangers for thermoacoustic engines/refrigerators. Unlike the vapor cycle refrigerators in widespread use today, thermoacoustic refrigeration does not involve the use of chloroflourocarbons (CFCs) that are potentially harmful to the ozone layer in the atmosphere. Additionally, thermoacoustic refrigerators do not contain many moving parts, which can substantially reduce maintenance costs. Thermoacoustic refrigeration uses sound waves to remove heat from the refrigerated space to produce the cooling effect. Unlike uniform flow, however, there is little data available to quantify the heat transfer exchange with bodies in an oscillating flow.

In order to make the commercial use of the thermoacoustic refrigerator an eventual reality, it must be economically competitive with conventional vapor cycles. At present, thermoacoustic refrigeration is less efficient than conventional cooling. Designing effective heat exchangers for use in an acoustic field is a crucial step in making these refrigerators more efficient. To accomplish this, experimental data must be collected to correlate the heat transfer rate from a heat exchanger to the acoustic field characteristics so as to allow a more knowledgeable design.

Wheatley et al. (1983) and Atchley et al. (1990) have performed detailed experiments to examine the heating/cooling thermoacoustic effect produced by a standing acoustic wave. Raney et al. (1954), Westervelt (1960), and Nyborg (1965) have developed theory for the behavior of acoustic streaming flow around isolated bodies. Mozurkewich (1995), and Gopinath and Harder (2000), have performed heat transfer

experiments with an isolated cylinder in an oscillating flow. Correlations to relate the dimensionless parameters important to heat transfer, namely the Nusselt Number (Nu_d) as a function of the Streaming Reynolds Number (Re_s) were found by Gopinath and Harder (2000). Common heat exchanger designs, however, usually consist of not a single isolated cylinder, but several tubes arranged in various geometries. One common geometry is a bank of tubes in a transverse arrangement, i.e. placed with its plane normal to the direction of flow – it is this particular geometry which forms the subject of study in this thesis. Depending on the distance between the tubes, the boundary layers formed on the surface of the tubes by the oscillating flow may interfere with each other and have a deleterious affect on the heat transfer rate. It would be beneficial then, to determine the extent of this interference so that heat exchanger design could incorporate this influence.

This experimental work involves the correlation of the Nusselt number to the streaming Reynolds number for a transverse bank of cylindrical tubes subjected to an acoustic field. A high power, standing, resonant wave is generated in an isolated chamber by an acoustic compression driver. The resulting oscillating cross flow is used to remove heat from a heated cylinder with unheated or “dummy” cylinders placed alongside it to simulate the various neighboring tubes as in a heat exchanger bank. The data required to calculate the Nusselt number and streaming Reynolds number are gathered using various electronic instruments. The uniform spacing between the cylinders is parametrically varied so that the resultant effect of the boundary layer interference on the heat transfer can also be determined.

II. BACKGROUND

A. ACOUSTIC FIELDS

Classical fluid dynamics and convective heat transfer studies have for obvious reasons focused most attention on uniform fluid flows, i.e. flows which do not reverse direction, let alone do so in a rapid and repetitive manner as in an acoustic field. The fluid is put into motion by some force, such as a fan, pump, or atmospheric wind. The moving fluid then transfers heat into, or away from, a surface, and is then carried away. A common example is the air flowing through the finned passages of the radiator of an automobile. This situation could be modeled as a uniform flow of cool air at a velocity approximately equal to the speed of the vehicle, flowing across finned tubes carrying hot engine coolant.

Oscillating flow, on the other hand, is a situation in which the fluid flow direction changes continuously back and forth. The fluid velocity has a zero mean since the amplitudes of oscillation in both directions are equal, but their directions are opposite. There is no net movement of the fluid over time. However, there can still be heat transfer in an oscillating flow because convection occurs due to the basic motion of the fluid, regardless of the fluid direction. Heat transfer from an oscillating flow has been studied more and more frequently in the latter half of the twentieth century, as reviewed for instance by Richardson (1967).

In an acoustic sound field, an acoustic driver vibrates and causes the fluid oscillation. If a resonant field is isolated inside a chamber, such as a plane-ended cylinder, the field will have a standing wave distribution, i.e. sinusoidally varying

pressure and velocity distributions that are 90 degrees out of phase with each other. A pressure antinode, or maximum, is created at the planar rigid end termination of the chamber where the velocity is zero from the no-slip boundary condition. This situation is illustrated in Figure 1. Since the pressure and velocity fields are 90 degrees out of phase (like the sine and cosine functions), the pressure will ideally be at an antinode where the velocity is at a node, and vice versa. This characteristic has major implications as far as heat transfer is concerned, as will be discussed later.

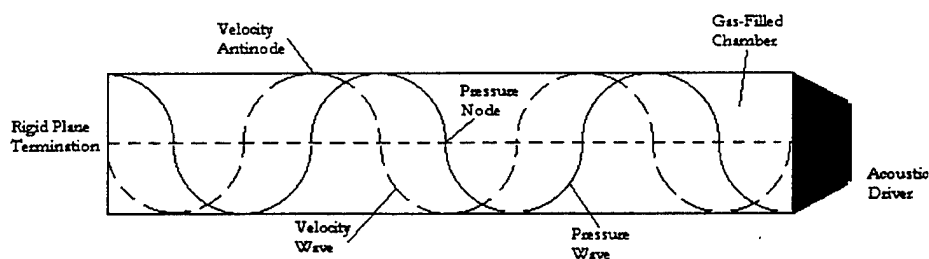


Figure 1: Resonate Standing Acoustic Wave in an Isolated Chamber

B. THERMOACOUSTIC REFRIGERATION

A temperature gradient along a tube can cause pressure oscillations in the fluid along the tube surface, which can create audible sound under the right circumstances. The basic principle behind thermoacoustic refrigeration is the fact that this process can also be

reversed, i.e an acoustic field under the right circumstances can be used to create a thermal effect. Garrett and Hofler (1992), and Swift (1995), describe thermoacoustic refrigeration in detail. The simplified model in Figure 2 depicts a basic thermoacoustic refrigerator. A stack of thin plates with low thermal conductivity is placed at a specific location within an isolated sound chamber. An acoustic driver at one end oscillates the gas (typically air or a low Prandtl number gas mixture) inside the chamber. The fluid oscillates between high and low pressure locations inside the tube. According to classical thermodynamics, as a gas particle is compressed in a high-pressure region, its temperature increases. It will therefore give heat off to the stack at that location. As it oscillates back to a low-pressure region and expands, its temperature decreases, and it removes heat from the stack at that location. A heat exchanger at each end of the stack is where the stack's temperature gradient is utilized for refrigeration. Essentially, sound is the mechanical energy that serves to pump heat from the cold exchanger to the hot exchanger. The magnitude of the temperature gradient along the stack increases as the pressure ratio of the fluid oscillation increases.

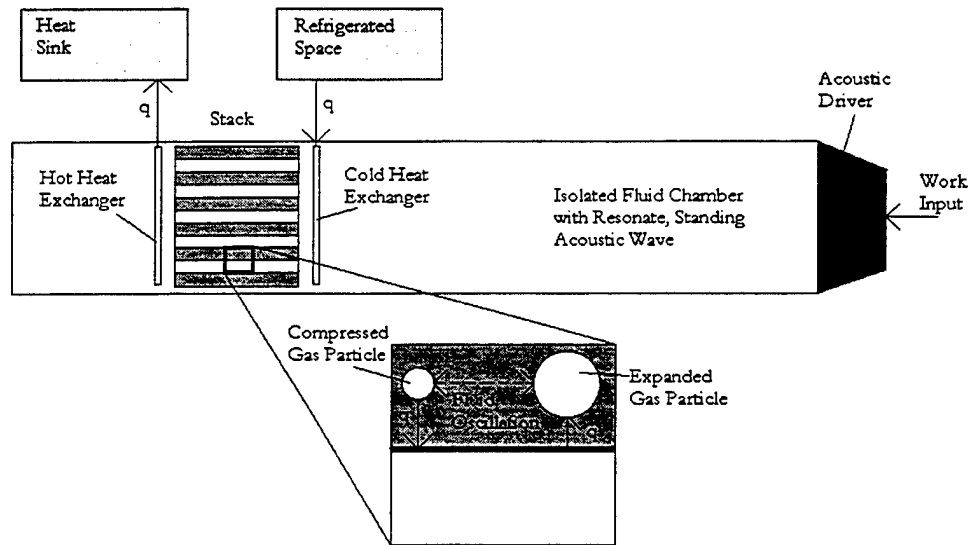


Figure 2: Thermoacoustic Refrigerator

C. BOUNDARY LAYERS

To utilize the temperature gradient along the stack, heat exchangers must be able to transfer heat away from the low temperature end of the stack to the high temperature end. These heat exchangers must be able to do this as efficiently as possible if a large temperature gradient is to be obtained.

In convective heat transfer with a uniform flow, a higher fluid velocity will generally mean a higher convective heat transfer coefficient (h). The same is true in an oscillating fluid flow. It would seem logical, therefore to place the heat exchangers at pressure nodes, where the velocity is at a maximum. This condition may require that a gap in physical contact exist between the stack and the heat exchanger. It is therefore all the more important for the heat exchanger to be efficient.

The most common heat exchanger designs utilize several cylinders placed parallel and in line, with their plane perpendicular to the cross flow of the fluid. Garrett et al. (1994) have provided a preliminary heat exchanger design based however on the

principles of conventional mean flow analysis. Figure 3 shows a common heat exchanger tube bank type arrangement.

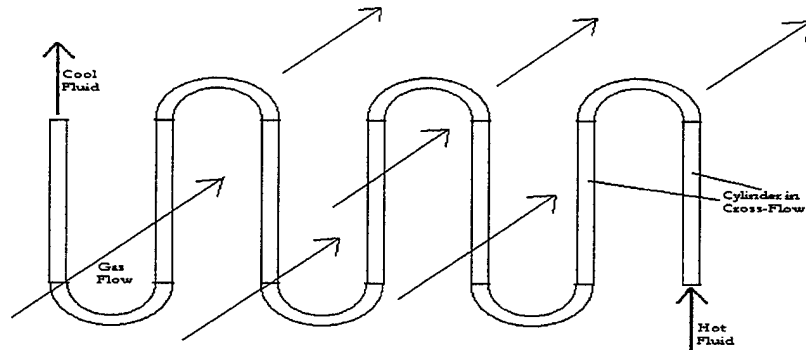


Figure 3: Heat Exchanger

If the parallel cylinders in a flow are close enough to each other, the boundary layer flow formed around each cylinder could interfere with the boundary layer on the adjacent cylinders. Figure 4 shows this situation. For this boundary layer interference to occur, the boundary layer thickness, (δ), must be at least half of the distance between the cylinders, (ζ). Therefore,

$$2\delta \geq \zeta$$

is the requirement for boundary layer interference to occur. In oscillating flows, δ depends on several parameters, including the frequency of fluid oscillation, as will be discussed later. If boundary layer interference occurs, the convective heat transfer coefficient between the cylinder and the fluid may be adversely affected. The heat transfer from a bank of cylinders may therefore deviate from the heat transfer from an isolated cylinder thus resulting in reduced performance effectiveness.

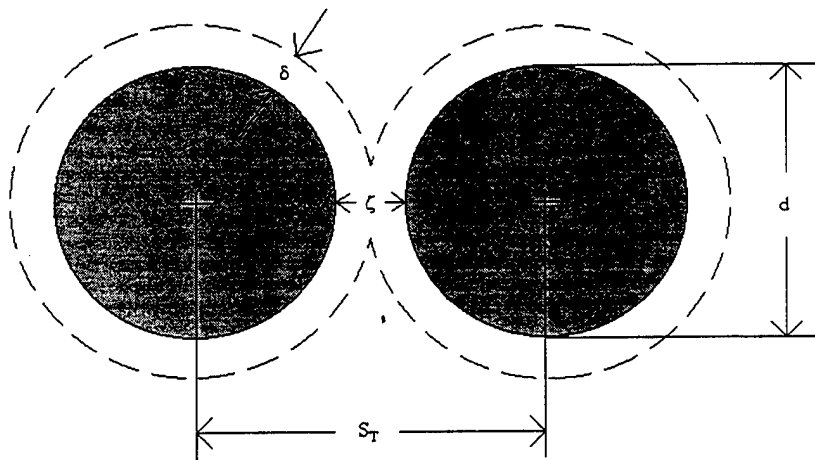


Figure 4: Boundary Layers on Cylinders in Cross Flow

Depending on design constraints, it may become necessary to place the tubes of a heat exchanger close enough to each other so that this boundary layer interference could become an issue. If this is the case, the quantitative influence of boundary layer interaction on the convective heat transfer coefficient would need to be known in order to more effectively design a heat exchanger for a thermoacoustic refrigerator. Finding this affect of boundary layer interference on the convective heat transfer coefficient is the ultimate goal of this experimental study.

III. EXPERIMENT

A. INTENT

Since a bank of cylindrical tubes may have a boundary layer interference effect on its convective heat transfer coefficient, direct extrapolation of experimental results for an isolated cylinder may not be realistic. This experiment is designed to examine the effects of spacing between the cylinders of a tube bank. A long cylindrical sound chamber was chosen for this experiment because it helps to restrict the sound waves to only the longitudinal direction of motion, thus preventing the occurrence and interference of transverse waves. Additionally, the sound chamber resembles the structure of a thermoacoustic engine, which is the practical application for which this experiment is intended.

B. DIMENSIONLESS PARAMETERS

In order to link one experimenter's results to another's, and to be able to apply results to a wide variety of situations other than the experiment itself, dimensionless parameters are necessary. Common convective heat transfer correlations for uniform flow over bluff bodies have long used such parameters as the Reynolds, Nusselt, Prandtl, and Grashof numbers. Oscillating flow is more complicated, however, and additional dimensionless parameters are necessary to fully describe the flow. Richardson (1967) gives a detailed derivation of these parameters.

1. Cylinder Length Scale

In order to assume that the flow around the tube bank is incompressible, the radian wavelength of the acoustic field must be large compared to the characteristic length of the cylinder. This characteristic length is chosen as the cylinder's diameter, d , and the radian wavelength, λ_R , is defined as

$$\lambda_R = \frac{\lambda}{2\pi} = \frac{c/f}{2\pi} = \frac{c}{\omega} \quad (1)$$

The requirement is that

$$\frac{d}{\lambda_R} \ll 1 \quad (2)$$

So χ is defined as the ratio of the characteristic length of the cylinder to the radian wavelength

$$\chi = \frac{d}{\lambda_R} = \frac{d\omega}{c} \ll 1 \quad (3)$$

By ensuring this requirement, Lighthill (1963) showed that radiation effects due to acoustic streaming are very small and can be neglected, making only the acoustic field important.

2. Amplitude Parameter

Another dimensionless parameter of importance is ε , defined as the ratio of the displacement amplitude of particle oscillation to the characteristic body length. After manipulation, ε can be expressed in terms of the pressure ratio of oscillation as shown by Gopinath and Harder (2000):

$$\varepsilon = \frac{c}{d\omega\gamma} \left(\frac{P_o}{P_m} \right) \quad (4)$$

If ε is small compared to unity, the flow will remain attached to the cylinder and will be laminar. If ε becomes greater, the flow will shed from the cylinder.

3. Frequency Parameter

A frequency parameter, Λ^2 , is defined as follows:

$$\Lambda^2 = \frac{d^2\omega}{\nu} \quad (5)$$

Gopinath and Harder (1999) showed that if Λ^2 is much greater than unity, the Stokes shear layer is confined to a narrow region and the acoustic streaming effect appears as slip velocity along the cylinder surface.

4. Interference Parameter

For cylinders arranged with axes parallel and with uniform separation, let S_T be the center to center distance between the cylinders. Then the distance between the outer edges of the cylinders at their closest point, ζ , is therefore

$$\zeta = S_T - 2r = S_T - d \quad (6)$$

Riley (1965) and Stuart (1966) showed that the boundary layer thickness, δ , of the steady streaming flow generated on the cylinder at its thickest is given by:

$$\delta = 10 \sqrt{\frac{\nu}{\omega}} \quad (7)$$

which is used here as the separation distance criterion for interference between the boundary layers. For parallel cylinders, boundary layer interference will occur if

$$\frac{\zeta}{2\delta} < 1 \quad (8)$$

Substituting the approximation for δ and squaring both sides, it follows that

$$\frac{\zeta^2 \omega}{400\nu} < 1 \quad (9)$$

is the requirement for boundary layer interference. This is called the interference parameter, ϕ , and can also be expressed in terms of other parameters

$$\phi = \frac{\zeta^2 \omega}{400\nu} = \frac{d^2 \left(\frac{S_T}{d} - 1 \right)^2 \omega}{400\nu} = \frac{\Lambda^2 \left(\frac{S_T}{d} - 1 \right)^2}{400} \quad (10)$$

Boundary layer interference will occur if $\phi < 1$.

5. Streaming Reynolds Number

The Reynolds number is a familiar dimensionless parameter in fluid dynamics and convective heat transfer. In oscillating flow, however, the parameter is modified to include the frequency and pressure ratio. Stuart (1966) and Riley (1966) found that both the frequency and amplitude parameter are necessary to define a suitable Reynolds number. The streaming Reynolds number, R_s , is defined as

$$R_s = \varepsilon^2 \Lambda^2 = \frac{c^2}{\omega \nu \gamma^2} \left(\frac{P_o}{P_m} \right)^2 \quad (11)$$

For buoyancy effects to be negligible, Gopinath and Harder (1999) showed

$$\frac{R_s^2}{G_R} \gg 1 \quad (12)$$

This criterion ensures that free convection is small compared to forced convection.

C. APPARATUS

The equipment utilized in this experiment consists of three main assemblies: the sound chamber, the tube bank, and the instruments used for data collection.

1. Sound Chamber

A long cylindrical tube is used to obtain a standing, resonant, isolated acoustic wave. The chamber is made of transparent plexi-glass. The inside diameter is 3" (~76mm), and the wall thickness is 1/4" (~6mm). The length of the chamber is 2m. The Chamber is supported by eight stations along its length, connected to a plexi-glass base plate. At one end of the chamber is the acoustic driver, and at the other end is an adjustable endplate that allows the length of the tube to be varied. The end plate makes an airtight seal to the inside chamber wall with a rubber O-ring. Figure 5 shows the sound chamber. The acoustic driver is a JBL® Model 2490H midrange compression driver with 8Ω impedance and a frequency range of 250Hz to 2.5kHz.

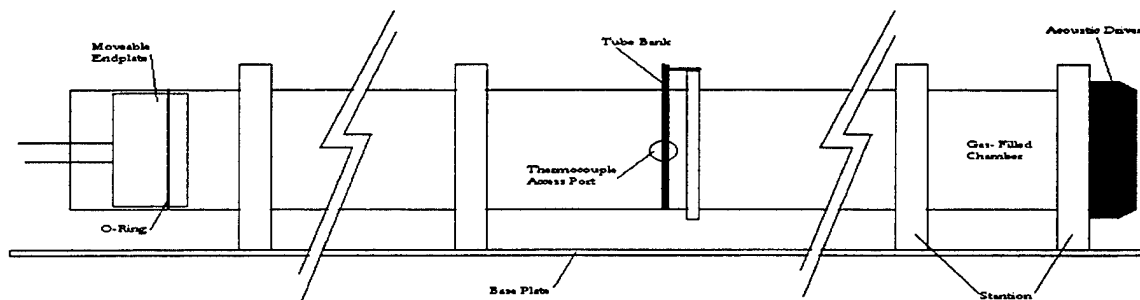


Figure 5: Experimental Sound Chamber

2. Tube Bank

The tube bank consists of a central heated cylinder and two “dummy” cylinders on each side of it. The heated cylinder is a smooth surfaced Watlow® cartridge heater with a 1/8” diameter. In addition to the internal heating element, the heater contains a type J thermocouple to measure the surface temperature of the cylinder. When inside the sound chamber, the cylinder length to diameter ratio is ~24, which ensures that end effects can be considered negligible for heat transfer calculations. The “dummy” cylinders are smooth 1/8” diameter brass tubes. The cylinders are put into the sound chamber through oblong grooves cut through the chamber’s top and bottom surfaces. The grooves allow the spacing between the cylinders, S_T , to be varied. The tubes are held in place by an aluminum plate fastened to the outside of the chamber. Figure 6 shows the tube bank arrangement. In order to ensure that the sound chamber is sealed and isolated from the outside air, Silly Putty® is used to fill the grooves around the cylinders.

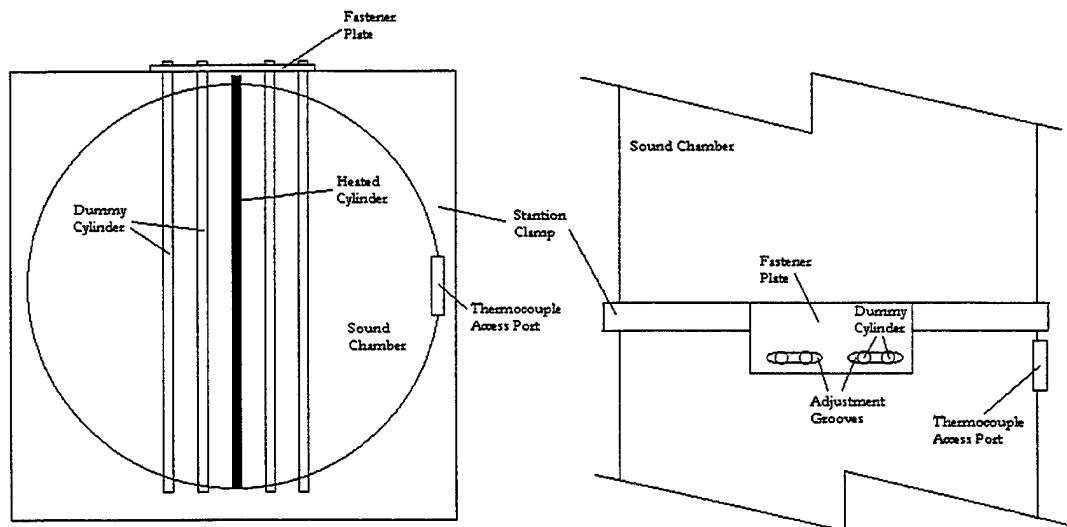


Figure 6: Tube Bank

3. Electronic Instruments Package

A Hewlett Packard® 33120A variable waveform generator is used to power the acoustic driver with a sinusoidal signal at the desired frequency. Prior to being input to the acoustic driver, the signal is amplified by a Techtron® 7540 power amplifier.

The adjustable endplate of the sound chamber was fitted with an Endevco® model 8510B-5 pressure transducer. The transducer's sensitivity, S , is 50.89mV/psi. The transducer output goes to a pre-amp with a gain, G , of 100, which gives an amplified gain of 5089mV/psi. The pre-amp then is input into a Hewlett Packard® 3562A dynamic signal analyzer. The signal analyzer allows the output from the pressure transducer, V_{mic} , to be observed in both time domain and power spectrum outputs. Using the power spectrum output, the pressure ratio of the resonant wave inside the chamber can be calculated as follows

$$\frac{P_o}{P_m} = \frac{V_{mic} / SG}{P_m} \quad (13)$$

Where P_m is the mean atmospheric pressure of 14.7psi, and P_o is the difference between the maximum pressure in the sound chamber (which occurs at pressure antinodes, or velocity nodes) and P_m . The power spectrum also allows disturbances from harmonics and other sources to be observed so that they can be minimized.

The power to the heated cylinder is supplied by a Kikusui® model PAR 160A regulated DC power supply. To measure the power to the heater, the voltage drop across it and the current running through it are measured. A Hewlett Packard® 34401A digital

multimeter is placed in parallel with the heater to measure the voltage across it, V_H . The current through the heater, I_H , is calculated by measuring the voltage drop across a resistor of known resistance, R_R , and applying Ohm's law

$$I_H = I_R = \frac{V_R}{R_R} \quad (14)$$

Figure 7 is the electrical circuit used to calculate the power to the heated cylinder.

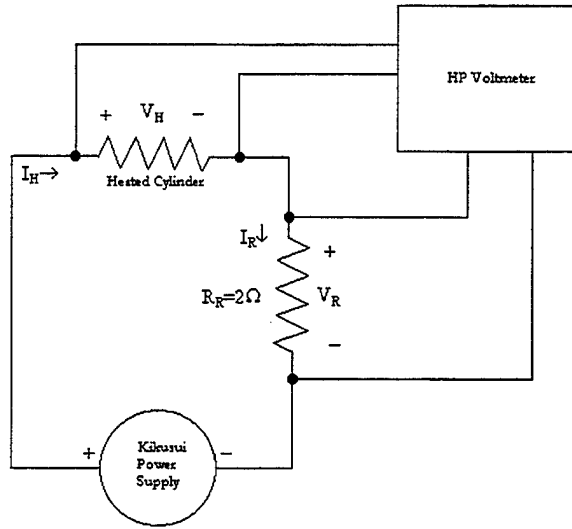


Figure 7: Heater Circuit

Finally, a Keithley® 740 system-scanning thermometer is used to measure the heated cylinder surface temperature and the ambient fluid temperature. As stated earlier, the heater is supplied with an internal type J thermocouple. The ambient temperature is taken with a type E thermocouple inside a small probe. The probe is inserted into the

sound chamber via a removable access port in the side of the chamber. The thermometer can be toggled between the thermocouples to record both temperatures.

Figure 8 shows the schematic of the instruments used in the experiment. Figure 9 is a photograph of the experimental apparatus.

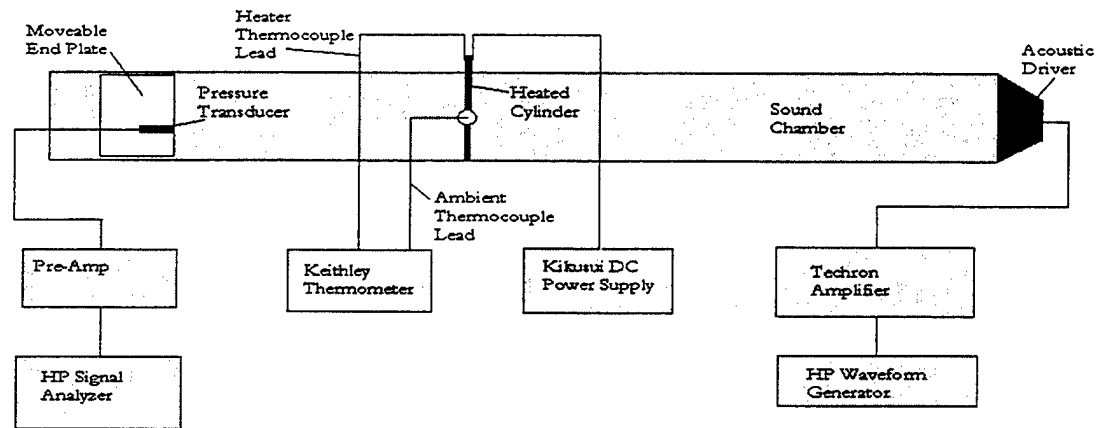


Figure 8: Instruments Schematic

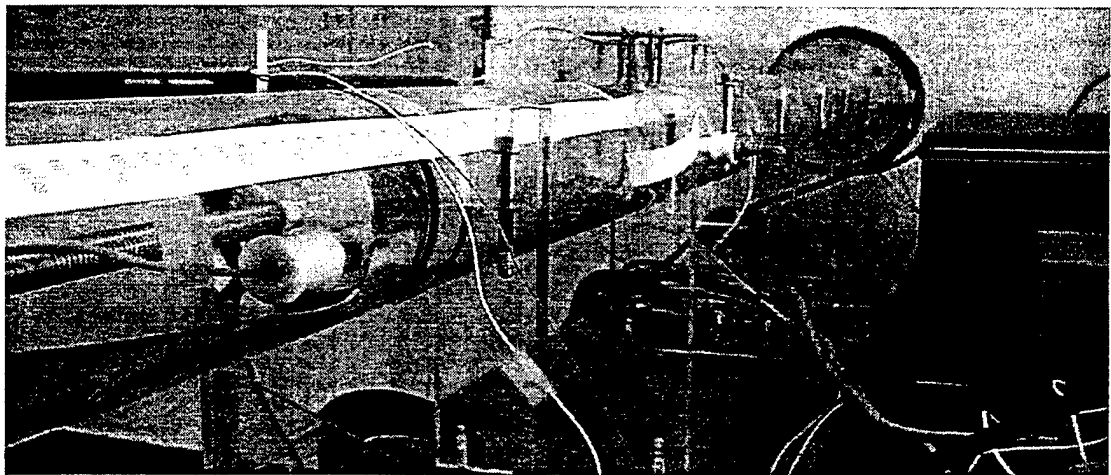


Figure 9: Photograph of Experimental Apparatus

D. PROCEDURE

Before data “runs” could begin, frequencies and corresponding chamber lengths had to be found that would set up a resonant, standing wave inside the chamber with a velocity antinode at the tube bank location. From Figure 10, it is obvious that the distance L must be an odd multiple of $\lambda/4$. Put another way,

$$n = \frac{4Lf}{c} \quad (15)$$

and n must be an odd integer. To accomplish this, a pressure transducer was placed at the chamber surface at the location of the tube bank. The acoustic driver was then powered with an arbitrary frequency, and an arbitrary tube length. The frequency was adjusted until V_{mic} was at a minimum. Next, n was calculated to see if it was indeed an odd integer. If not, the chamber length was adjusted by moving the endplate and the process was repeated. In all, 6 resonant frequencies were found. These frequencies are listed in Table 1.

| f (Hz) | L (m) | n | $\max P_o/P_m$ (%) |
|----------|---------|-------|--------------------|
| 383 | 0.24 | 1.069 | ~3.3 |
| 676 | 0.65 | 5.109 | ~3.1 |
| 723 | 0.6 | 5.044 | ~3 |
| 925 | 0.65 | 6.991 | ~2.8 |
| 1202 | 0.65 | 9.085 | ~2 |
| 1461 | 0.65 | 11.04 | ~1.3 |

Table 1: Resonate Frequencies Used

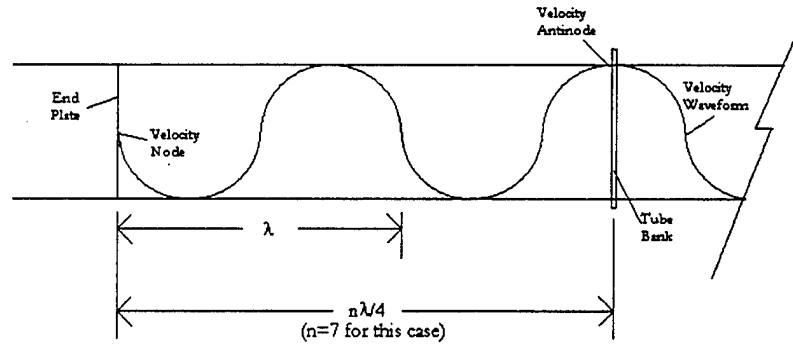


Figure 10: Geometry for Maximum Velocity at Tube Bank

Once the frequencies are identified, it is necessary to determine the maximum possible pressure ratio for each frequency, without too much interference from harmonics and other sources. This is done by observing the power spectrum. Since the first harmonic of the frequency, $2f$, is out of phase with the primary signal, it will not interfere. However, the second harmonic, $3f$, is in phase and will therefore interfere with the primary signal. The pressure ratio was increased until the transducer voltage from the second harmonic was 5% of the primary signal. This value of 5% interference was taken as the cutoff for the maximum pressure ratio. The maximum pressure ratio for each frequency is listed in Table 1.

After the resonant frequencies and the maximum possible pressure ratios were found, the data collection could begin. The first step was to set the tube bank spacing. Four values of S_T/d were used in this experiment; 1.25, 1.5, 1.75, and 2.0. The spacing

was measured to .001" using calipers. After the spacing was set, the tubes were inserted into the chamber and sealed with putty.

Once the spacing was set, the data collection could begin. First, the power to the heated cylinder was engaged. The heater would then begin to rise in temperature, which was monitored by the thermometer. Next, the acoustic driver was powered by turning on the power amplifier. The power to the driver was increased until the temperature of the heater would level off and attain a steady state value. If the pressure ratio of the driver was too small, the heater would continue to rise in temperature. If the pressure ratio was too large, the heater temperature would begin to decrease. Once a steady state temperature was achieved, the data was recorded. V_{mic} was recorded first, then V_H and V_R . The steady state temperature of the heater, T_H , was recorded, then the power to the driver and the power to the heater were simultaneously disengaged. The ambient thermocouple probe was then inserted into the chamber and the ambient temperature recorded. This completed the data collection for one data point. For each frequency, at each tube spacing, twenty data points were taken. The voltage across the heater was then raised slightly and the process repeated.

Once the data was collected, the Nusselt number and Streaming Reynolds Number were calculated using a computer spreadsheet. The Nusselt number, Nu_d , is defined as

$$Nu_d = \frac{hd}{k_{air}} \quad (16)$$

Where the convective heat transfer coefficient, h , is defined as

$$h = \frac{Q_H}{A_H(\Delta T)} \quad (17)$$

The power to the heater is

$$Q_H = I_H V_H = \frac{V_R}{R_R} V_H \quad (18)$$

Additionally,

$$A_H = \pi d L_H \quad (19)$$

$$(\Delta T) = T_H - T_A \quad (20)$$

Using Eqns. (16) through (20), Nu_d was calculated by

$$Nu_d = \frac{V_R V_H}{\pi R_R L_H (T_H - T_A) k_{air}} \quad (21)$$

The values of ϵ , χ , Λ^2 , ϕ , and R_s were then calculated as described previously. The speed of sound, the kinematic viscosity, and k_{air} were calculated at the average fluid temperature

$$T_{avg} = \frac{T_H + T_A}{2} \quad (22)$$

IV. RESULTS AND DISCUSSION

A total of over 450 individual data points were calculated for the six frequencies and four tube spacing values as described in the previous chapter. Table 2 shows the ranges of the different dimensionless parameters covered during the experiment.

| Parameter | min | max |
|-------------|-------|-------|
| epsilon | 0.01 | 1 |
| x | 0.02 | 0.08 |
| Λ^2 | 1500 | 5900 |
| phi | 0.2 | 15 |
| Po/Pm | 0.50% | 3.30% |
| Rs | <10 | 1500 |

Table 2: Parameter Ranges Used

For values of $\phi > 1$, the results replicate those of an isolated cylinder (to within experimental error). Although this conclusion might have been expected since there is no boundary layer interference anticipated in this regime, it nonetheless provides a firm corroboration with the earlier single cylinder results of Gopinath & Harder (2000). For “low” values of R_S the relationship between Nu_d and R_S is expected to be of the form

$$Nu_d = Y Pr^x R_S^{0.5} \quad (23)$$

which exemplifies the laminar, attached flow regime. This low-amplitude attached and laminar behavior of the flow has also been demonstrated by Sarpkaya (1986) in an independent context, i.e. on the basis of force measurements on a cylinder in an

oscillatory flow. Since Pr is constant throughout this heat transfer experiment ($Pr_{air}=0.7$), it can be included in the constant Y and the relationship becomes

$$Nu_d = CR_s^{0.5} \quad (24-a)$$

Gopinath and Harder (2000) found that at larger values of R_s , the data has a steeper trend, roughly proportional to $R_s^{0.75}$ which may be attributable to vortex shedding resulting from flow instabilities. For R_s values >500 , the data was correlated using the form

$$Nu_d = CR_s^{0.75} \quad (24-b)$$

Table 3 shows the values of the constant C in Eqns. (24-a) and (24-b), correlated using a transition of $R_s=500$. Figures 11-13 are logarithmic plots of Nu_d vs. R_s for S_T/d values of 1.5, 1.75, and 2.0, respectively. Best-fit lines are constructed from Eqns. (24-a) and (24-b). Error bars from an uncertainty analysis (Appendix C) are included for arbitrary data points. Figure 14 is a plot of Nu_d vs. R_s for all data corresponding to $\phi > 1$.

Davidson (1973) predicted a correlation of $Nu_d=1.05R_s^{0.5}$ for the attached flow regime, while Gopinath and Harder (2000) found the leading coefficient to be 0.90. For “large” values of R_s , Gopinath and Harder (2000) have suggested that the correlation should be $Nu_d=0.20R_s^{0.75}$. Table 3 also includes the percentage deviation of the current experiment from these previous correlations.

| ST/d | Rs<500 | | | Rs>500 | |
|------|--------|--------------------|-----------------|--------|-----------------|
| | C | %Dev from Davidson | % Dev. From G&H | C | % Dev. From G&H |
| 1.50 | 1.08 | 3 | 20.1 | 0.218 | 8.95 |
| 1.75 | 0.91 | -13.4 | 1.1 | 0.192 | -3.8 |
| 2.00 | 1.14 | 8.7 | 26.8 | 0.219 | 9.55 |
| all | 1.08 | 3 | 19.8 | 0.203 | 1.35 |

Table 3: Correlation Data for $\phi > 1$

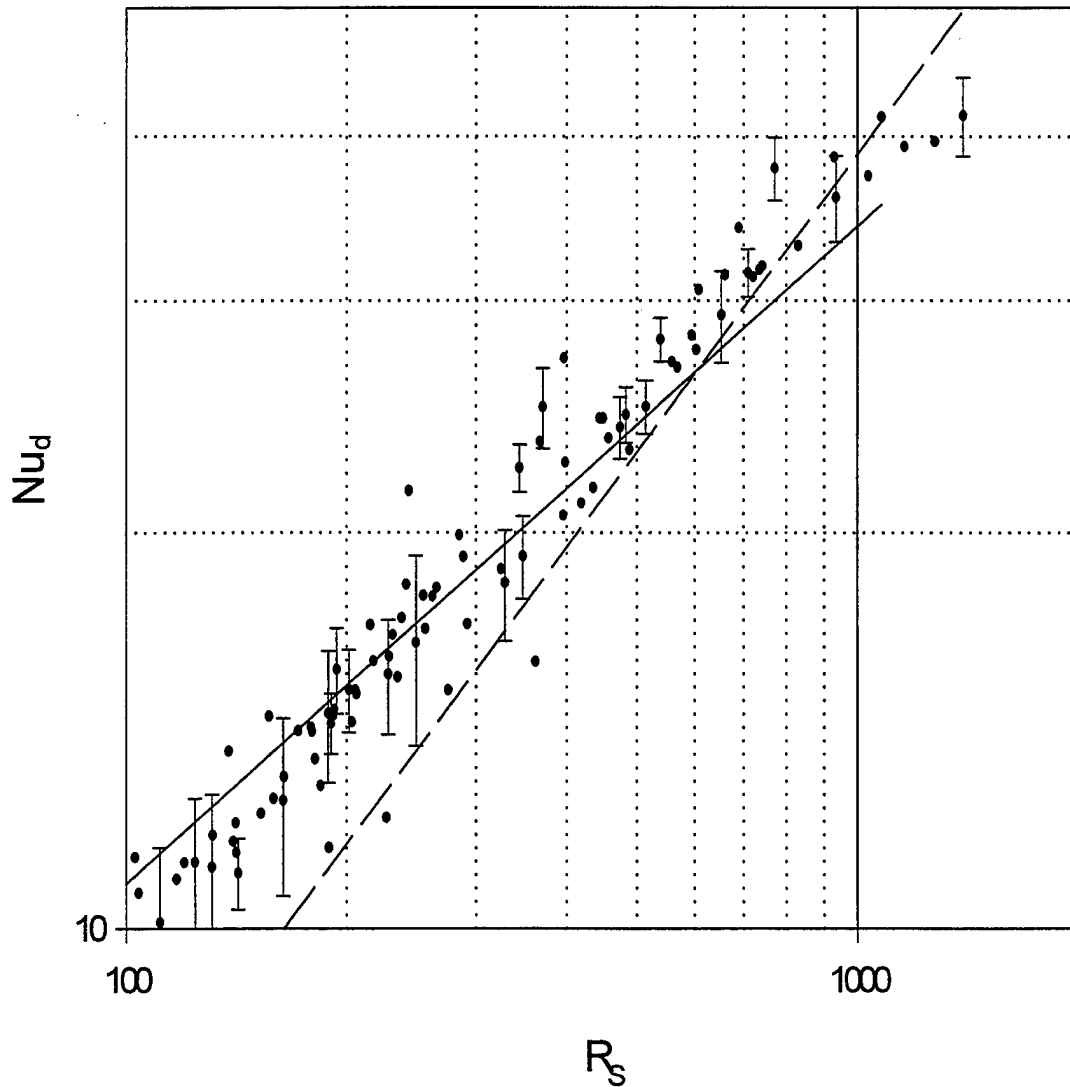


Figure 11: Nusselt Number vs. Streaming Reynolds Number for $S_T/d=1.5$.

The solid line is a $R_s^{0.5}$ fit through the data. The dashed line is a $R_s^{0.75}$ fit in the vortex shedding regime. Error bars are included for arbitrary data points.

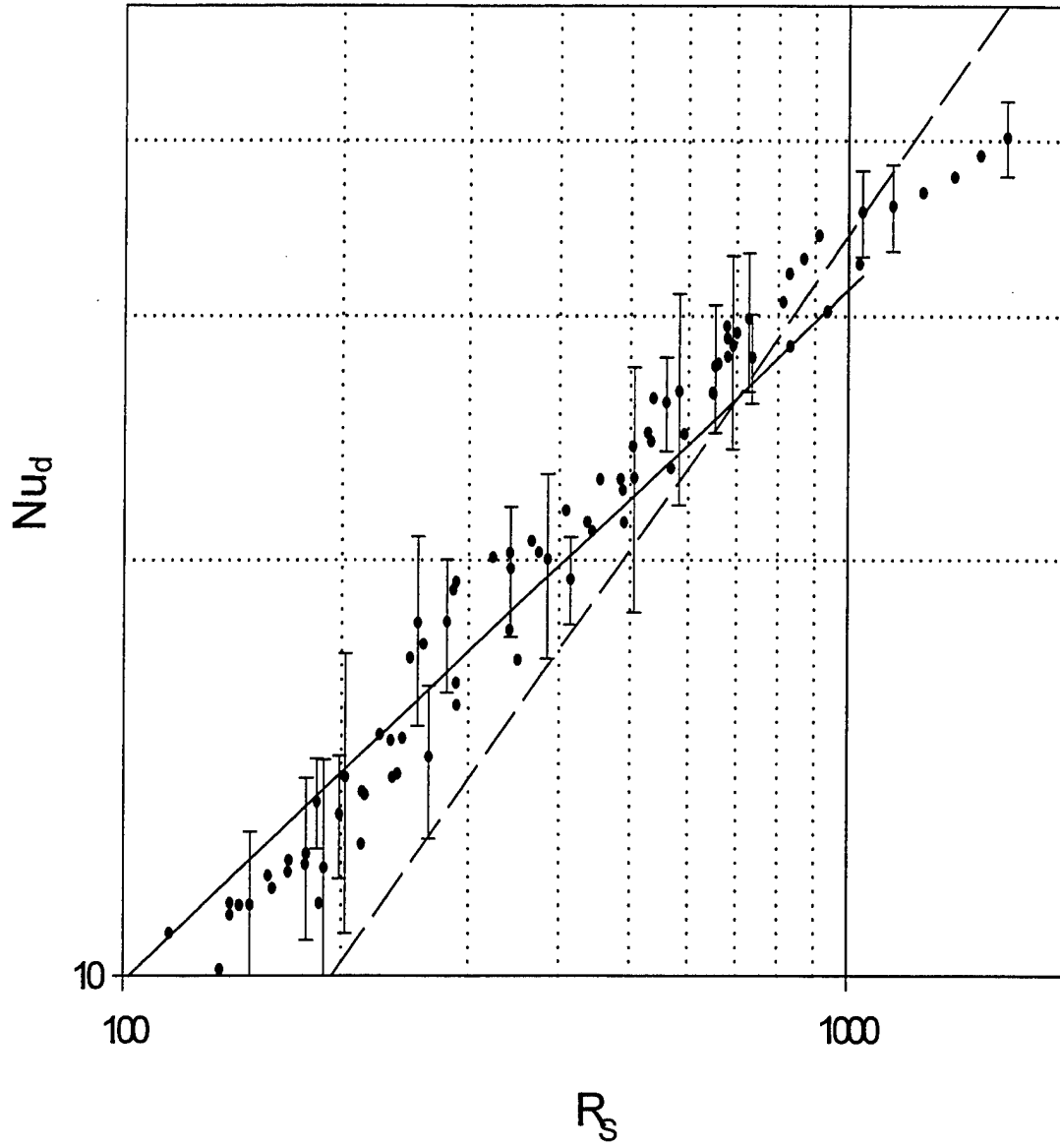


Figure 12: Nusselt Number vs. Streaming Reynolds Number for $S_T/d=1.75$.

The solid line is a $R_s^{0.5}$ fit through the data. The dashed line is a $R_s^{0.75}$ fit in the vortex shedding regime. Error bars are included for arbitrary data points.

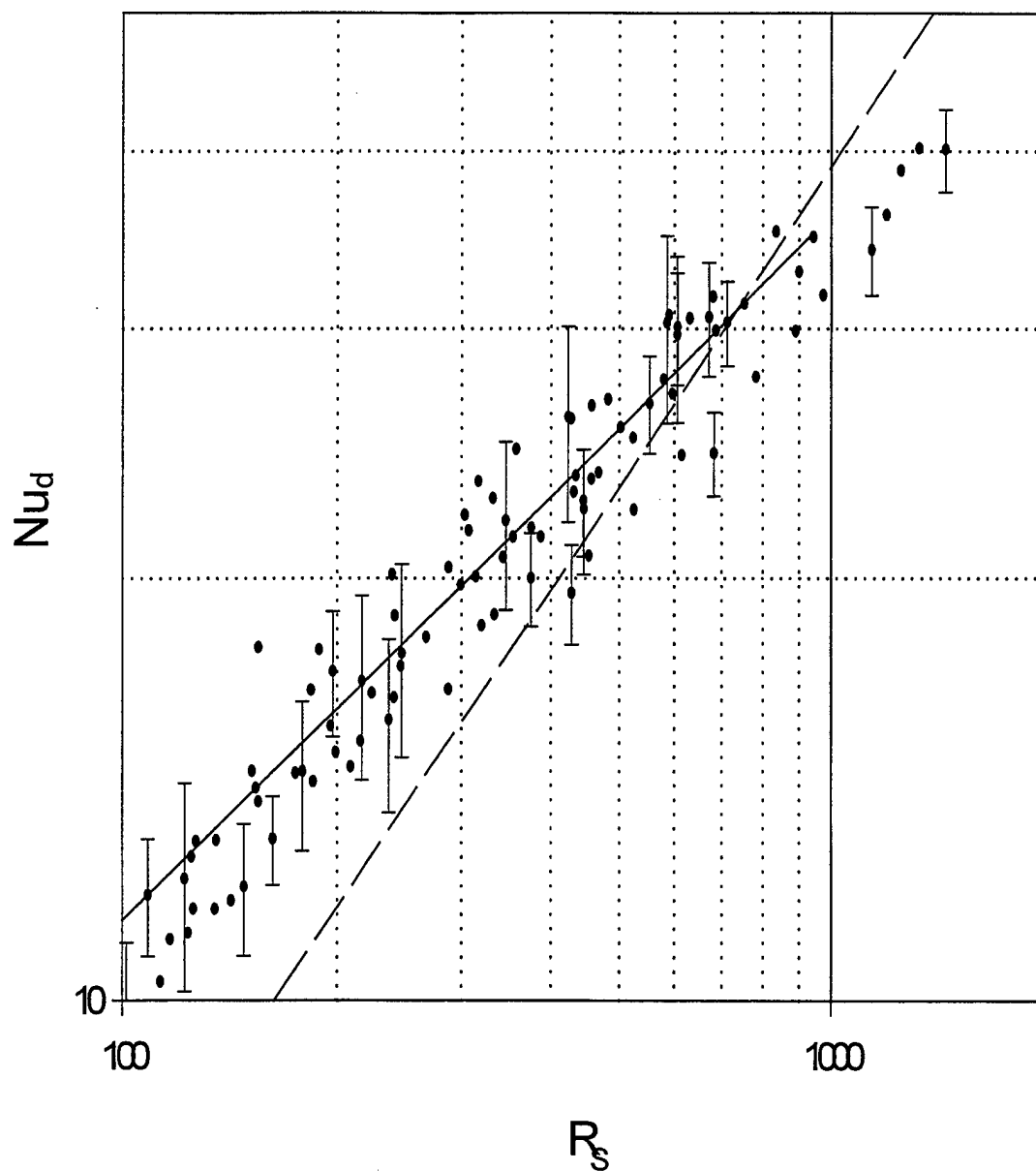


Figure 13: Nusselt Number vs. Streaming Reynolds Number for $S_T/d=2.0$.

The solid line is a $R_s^{0.5}$ fit through the data. The dashed line is a $R_s^{0.75}$ fit in the vortex shedding regime. Error bars are included for arbitrary data points.

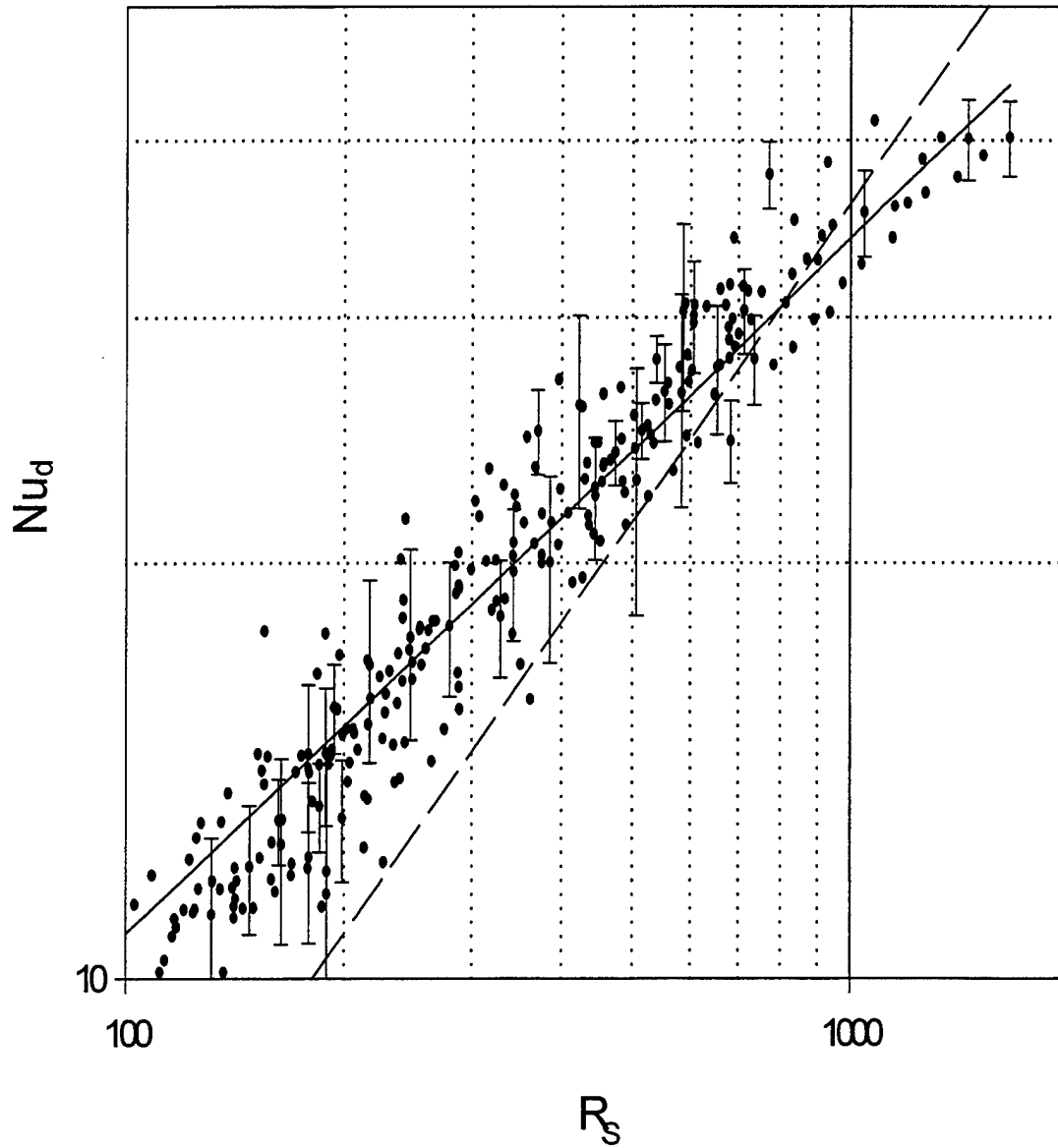


Figure 14: Nusselt Number vs. Streaming Reynolds Number for all $\phi > 1$.

The solid line is a $R_s^{0.5}$ fit through the data. The dashed line is a $R_s^{0.75}$ fit in the vortex shedding regime. Error bars are included for arbitrary data points.

Figures 11-14 indicate that the data from individual frequencies cannot be distinguished from one other. With $\phi > 1$, the data falls along roughly the same curve. Nu_d is independent of the tube spacing, and ϕ is not necessary to correlate the data.

Figure 15 is a logarithmic plot of Nu_d vs. Re_s for $S_T/d=1.25$. For this close spacing, $\phi < 1$ for all frequencies used, and boundary layer interference becomes an issue. From Figure 15 it is obvious that the data for the different frequencies do not fall on the same curve. Nu_d can not be correlated with Re_s alone, and the influence of ϕ must also be included. This data was correlated using the form

$$Nu_d = C \phi^a Re_s^b \quad (25)$$

Again, there was a transition at $Re_s=500$, so the correlations used $b=0.5$ for $Re_s < 500$, and $b=0.75$ for $Re_s > 500$. The following results were found

$$Nu_d = 1.07 \phi^{0.19} Re_s^{0.5} \quad Re_s < 500, \phi < 1 \quad (26-a)$$

$$Nu_d = 0.21 \phi^{0.11} Re_s^{0.75} \quad Re_s > 500, \phi < 1 \quad (26-b)$$

Eqns. (26-a) and (26-b) show that as $\phi \rightarrow 1$, the correlations converge to those of an isolated cylinder.

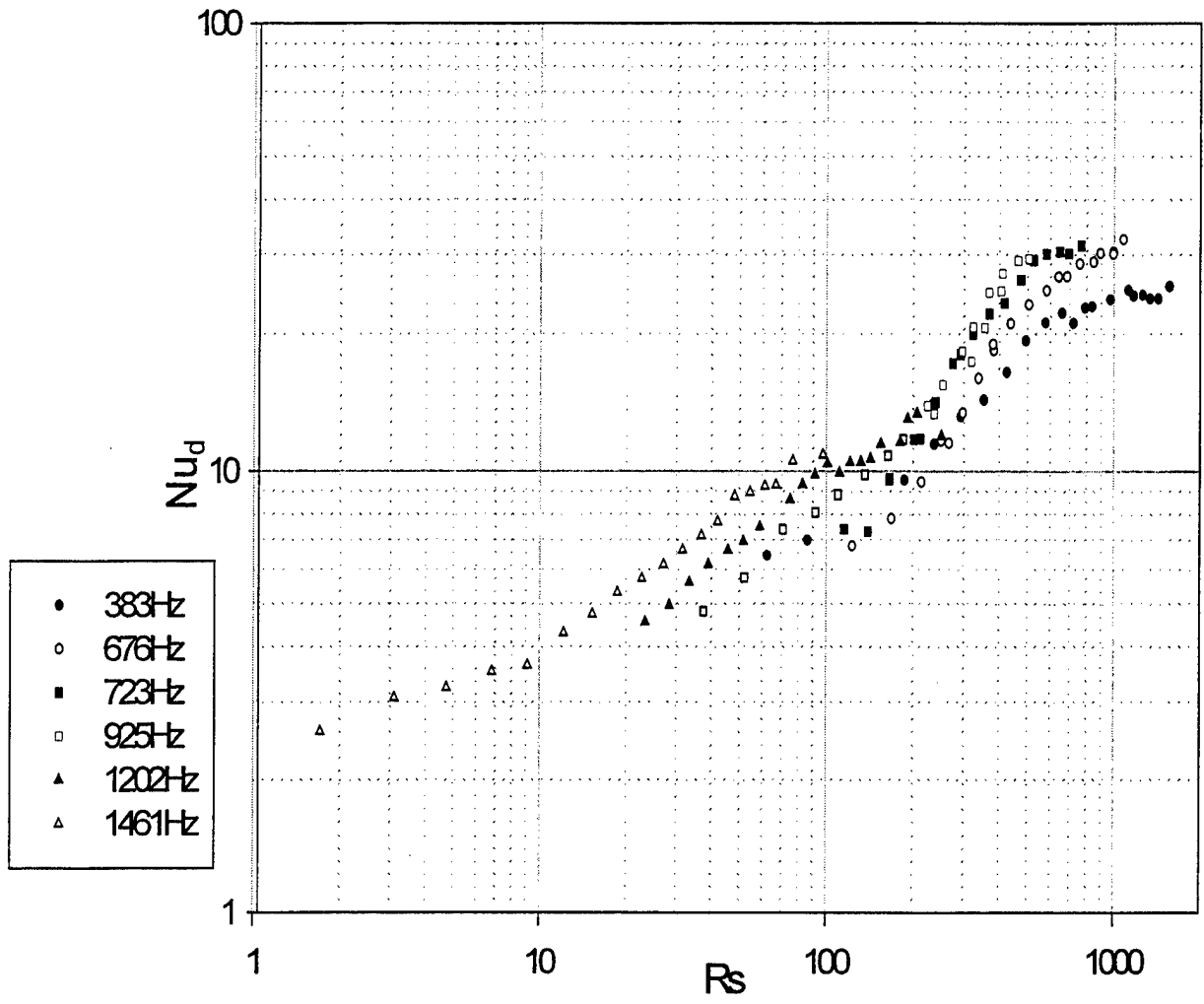


Figure 15: Nusselt Number vs. Streaming Reynolds Number for $ST/d=1.25$.

The interference parameter ϕ is <1 for all frequencies.

V. CONCLUSIONS AND RECOMMENDATIONS

Experiments were performed to determine the effect of tube spacing on convective heat transfer from a tube bank in a zero mean oscillating flow. A tube bank is used to model a heat exchanger. The role of the interference of boundary layers on adjacent tubes in the tube bank was discussed. The effect of boundary layer interference is needed to design more efficient heat exchangers for thermoacoustic engines.

Without boundary layer interference, the heat transfer from a tube bank closely follows that of an isolated cylinder. It was found that, as expected, the Nusselt number does not depend on tube pitch for sufficiently large spacings corresponding to values of ϕ greater than 1. However for values of ϕ less than 1, the Nusselt number must be correlated to ϕ as well as Re_s . As the tube spacing and hence ϕ decreases, the heat transfer rate characterized by Nu_d is degraded. However, the decrease in Nu_d is not great, especially at high values of Re_s . At high streaming Reynolds numbers, ϕ can be as low as 0.12 although Nu_d is still at 80% of its value for $\phi=1$. At low streaming Reynolds numbers, ϕ can be as low as 0.32 and still have less than 20% degradation in Nu_d . It can be concluded that only a small sacrifice in heat transfer will result from having closely spaced tubes. Provided that ϕ is not too small, heat exchanger designs can use a cluster of many closely spaced tubes, allowing more cooling fluid to be transported, without significantly degrading the heat transfer characteristics of each tube.

Based on a random error propagation analysis, it was determined that the greatest source of uncertainty came from temperature measurements. Future experiments would benefit from more precise measurements of temperature. Additionally, the way in which the ambient temperature is measured could be improved. Instead of inserting a

thermocouple probe into the sound chamber after the data run, a thermocouple permanently fixed to the inside surface of the sound chamber, in such a way as to not interfere with the flow characteristics, would allow the ambient temperature and cylinder temperature to be recorded simultaneously.

To carry this study further, it is recommended that a similar experiment be conducted to determine the affect of an in-line arrangement of cylinders, that is, a bank of cylinders arranged with their plane parallel to the direction of fluid oscillation. Such an experiment could study both aligned and staggered cylinders as in conventional heat exchanger tube bank arrangements. Additionally, determining the heat transfer characteristics of finned cylinders would greatly benefit heat exchanger design. Finally, experiments with fluids other than air would allow a Prandtl number dependence to be studied.

APPENDIX

A. SAMPLE CALCULATIONS

The following sample calculations use the following data:

Measured Values:

$$\begin{aligned}S_T/d &= 1.25 \\L &= .65 \text{ m} \\f &= 676 \text{ Hz} \\V_{mic} &= 1878 \text{ mV} \\V_R &= 0.17225 \text{ V} \\V_H &= 10.2805 \text{ V} \\T_H &= 28.6^\circ\text{C} \\T_A &= 22.9^\circ\text{C}\end{aligned}$$

Constants:

$$\begin{aligned}R_{air} &= 287 \text{ m}^2/\text{s}^2\text{K} \\\gamma &= 1.4 \\P_m &= 14.7 \text{ psi} \\L_H &= .076 \text{ m} \\S &= 50.89 \text{ mV/psi} \\G &= 100 \\d &= .003175 \text{ m}\end{aligned}$$

1. Nusselt Number

The average fluid temperature is:

$$T_{avg} = \frac{T_H + T_A}{2} = \frac{28.6^\circ\text{C} + 22.9^\circ\text{C}}{2} = 25.75^\circ\text{C} = 298.9\text{K} \quad (\text{A-1})$$

From this, the following values are taken from Kays (XXX):

$$k_{air} = .0260646 \text{ W/mK}$$

$$\nu = .00001563 \text{ m}^2/\text{s}$$

ΔT is calculated as follows:

$$\Delta T = T_H - T_A = 28.6^\circ C - 22.9^\circ C = 5.7^\circ C = 5.7 K \quad (A-2)$$

The Nusselt number is then calculated:

$$Nu_d = \frac{V_R V_H}{\pi R_R L_H (\Delta T) k_{air}} = \frac{(0.17225V)(10.2805V)}{\pi (2\Omega)(.076m)(5.7K)(.0260646 \frac{W}{mK})} = 24.96 \quad (A-3)$$

2. Streaming Reynolds Number

The speed of sound is given by:

$$c = \sqrt{\gamma R_{air} T_{avg}} = \sqrt{(1.4)(287 \frac{m^2}{s^2 K})(298.9K)} = 346.55 \frac{m}{s} \quad (A-4)$$

The pressure ratio is given by:

$$\frac{P_o}{P_m} = \frac{V_{mic}/SG}{P_m} = \frac{1878mV / (50.89mV/psi)(100)}{14.7psi} = .0251 \quad (A-5)$$

The angular frequency is:

$$\omega = 2\pi f = (2\pi \frac{rad}{cycle})(676Hz) = 4247.433 \frac{rad}{s} \quad (A-6)$$

The streaming Reynolds number is then:

$$R_s = \frac{c^2}{\omega \nu \gamma^2} \left(\frac{P_o}{P_m} \right)^2 = \frac{(346.55 \frac{m}{s})^2}{(4247.433 \frac{rad}{s})(.00001563 \frac{m^2}{s})(1.4)^2} (.0251)^2 = 581.5 \quad (A-7)$$

B. UNCERTAINTY ANALYSIS

This uncertainty analysis is done using uncertainty propagation found in Beckwith et al. (1993).

1. Nusselt Number

The Nusselt number equation is:

$$Nu_d = \frac{hd}{k_{air}} = \frac{V_H V_R}{\pi L_H R_R \Delta T k_{air}} \quad (A-8)$$

The fractional uncertainty of the Nusselt number is:

$$\frac{u_{Nu_d}}{Nu_d} = \sqrt{\left(\frac{u_{\Delta T}}{\Delta T}\right)^2 + \left(\frac{u_{V_R}}{V_R}\right)^2 + \left(\frac{u_{V_H}}{V_H}\right)^2 + \left(\frac{u_{R_R}}{R_R}\right)^2 + \left(\frac{u_{L_H}}{L_H}\right)^2 + \left(\frac{u_{k_{air}}}{k_{air}}\right)^2} \quad (A-9)$$

The uncertainties of the temperature measurements are 0.5°C. With $\Delta T = T_H - T_A$, the uncertainty of the temperature difference is:

$$u_{\Delta T} = \sqrt{\left(\frac{\partial \Delta T}{\partial T_H} u_{T_H}\right)^2 + \left(\frac{\partial \Delta T}{\partial T_A} u_{T_A}\right)^2} = \sqrt{[(1)(0.5^\circ C)]^2 + [(1)(0.5^\circ C)]^2} = .7071^\circ C = .7071 K \quad (A-10)$$

The uncertainties in the voltage measurements are taken from the HP multimeter's users manual:

$$u_{VR} = u_{VH} = 0.05\% \text{reading} + 0.02\% \text{full scale output}$$

The resistance uncertainty is 1% of the resistor value. The uncertainty of the heater length is 0.001". The uncertainty of k_{air} is 0.00005 W/mK.

2. Streaming Reynolds Number

The streaming Reynolds number is:

$$R_s = \left(\frac{R_{air}}{2\pi\gamma P_m^2} \right) \frac{T_{avg} V_{mic}^2}{f \nu G^2 S^2} \quad (A-11)$$

The fractional uncertainty is then:

$$\frac{u_{R_s}}{R_s} = \sqrt{\left(\frac{u_{T_{avg}}}{T_{avg}} \right)^2 + \left(\frac{u_f}{f} \right)^2 + \left(\frac{u_\nu}{\nu} \right)^2 + \left(2 \frac{u_{V_{mic}}}{V_{mic}} \right)^2 + \left(2 \frac{u_G}{G} \right)^2 + \left(2 \frac{u_S}{S} \right)^2} \quad (A-12)$$

With $T_{avg} = (T_H + T_A)/2$, the uncertainty in T_{avg} is:

$$u_{T_{avg}} = \sqrt{\left(\frac{\partial T_{avg}}{\partial T_H} u_{T_H} \right)^2 + \left(\frac{\partial T_{avg}}{\partial T_A} u_{T_A} \right)^2} = \sqrt{\left(\frac{0.5^\circ C}{2} \right)^2 + \left(\frac{0.5^\circ C}{2} \right)^2} = 0.3536^\circ C = 0.3536 K \quad (A-13)$$

The uncertainty in the frequency is taken from the HP waveform generator user's manual:

$$u_f = 20 \times 10^{-6} \times \text{reading}$$

The uncertainty in ν is $5 \times 10^{-10} \text{ m}^2/\text{s}$. The uncertainty in V_{mic} is 5mV. The uncertainty in G is 0.4. The uncertainty in S due to nonlinearity is given by the pressure transducer calibration data as 0.381mV/psi.

C. EXPERIMENTAL DATA

The following pages contain the data gathered through experimentation in computer spreadsheet form. All important parameters are listed, although some constants have been omitted to reduce size.

| Svd | | 1.25 | L (m) | | 0.24000 | | | | | | | | | | | | | |
|-----|--------|-----------|---------|----------|---------|-------|-----------|----------|----------|--------|---------|-----------|---------|---------|-------|------|--------|-------|
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | dellaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi |
| 1 | 383 | 544 | 0.08368 | 4.99560 | 28 | 23.2 | 4.8 | 25.6 | 0.026054 | 6.9998 | 346.465 | 1.56E-05 | 0.00727 | 0.23554 | 0.022 | 1554 | 86.189 | 0.243 |
| 2 | 383 | 463 | 0.08195 | 4.89270 | 28.2 | 23.2 | 5 | 25.7 | 0.026061 | 6.444 | 346.523 | 1.56E-05 | 0.00619 | 0.2005 | 0.022 | 1553 | 62.417 | 0.243 |
| 3 | 383 | 1577 | 0.19517 | 11.65210 | 32.2 | 23.6 | 8.6 | 27.9 | 0.026222 | 21.119 | 347.796 | 1.58E-05 | 0.02108 | 0.68542 | 0.022 | 1533 | 720.04 | 0.239 |
| 4 | 383 | 1651 | 0.20544 | 12.26480 | 32.3 | 23.5 | 8.8 | 27.9 | 0.026222 | 22.867 | 347.796 | 1.58E-05 | 0.02207 | 0.71758 | 0.022 | 1533 | 789.2 | 0.239 |
| 5 | 383 | 1700 | 0.22101 | 13.19470 | 33.7 | 23.6 | 10.1 | 28.65 | 0.026276 | 23.011 | 348.229 | 1.59E-05 | 0.02272 | 0.7398 | 0.022 | 1526 | 835.14 | 0.238 |
| 6 | 383 | 1971 | 0.23521 | 14.04250 | 34.2 | 23.7 | 10.5 | 28.95 | 0.026298 | 25.049 | 348.402 | 1.59E-05 | 0.02635 | 0.85816 | 0.022 | 1523 | 1121.8 | 0.238 |
| 7 | 383 | 1833 | 0.23922 | 14.28190 | 35.1 | 23.7 | 11.4 | 29.4 | 0.026331 | 23.835 | 348.661 | 1.6E-05 | 0.0245 | 0.79867 | 0.022 | 1519 | 969.09 | 0.237 |
| 8 | 383 | 2090 | 0.24621 | 14.69890 | 35.5 | 23.7 | 11.8 | 29.6 | 0.026345 | 24.378 | 348.776 | 1.6E-05 | 0.02794 | 0.91095 | 0.022 | 1517 | 1259.2 | 0.237 |
| 9 | 383 | 2154 | 0.25628 | 15.30020 | 36.7 | 23.7 | 13 | 30.2 | 0.026389 | 23.936 | 349.122 | 1.6E-05 | 0.02879 | 0.93977 | 0.022 | 1512 | 1335.5 | 0.236 |
| 10 | 383 | 2229 | 0.25628 | 15.30020 | 36.8 | 23.8 | 13 | 30.3 | 0.026396 | 23.929 | 349.179 | 1.61E-05 | 0.0298 | 0.97265 | 0.022 | 1511 | 1429.8 | 0.236 |
| 11 | 383 | 2010 | 0.22268 | 13.29430 | 33.3 | 23.6 | 9.7 | 28.45 | 0.026262 | 24.338 | 348.113 | 1.59E-05 | 0.02687 | 0.87441 | 0.022 | 1528 | 1168.1 | 0.239 |
| 12 | 383 | 2325 | 0.21700 | 12.95520 | 32.4 | 23.6 | 8.8 | 28 | 0.026229 | 25.508 | 347.854 | 1.58E-05 | 0.03108 | 1.01069 | 0.022 | 1532 | 1664.7 | 0.239 |
| 13 | 383 | 1507 | 0.20163 | 12.03750 | 32.2 | 23.5 | 8.7 | 27.85 | 0.026218 | 22.283 | 347.767 | 1.58E-05 | 0.02014 | 0.65494 | 0.022 | 1533 | 657.62 | 0.24 |
| 14 | 383 | 1410 | 0.18722 | 11.17750 | 31.5 | 23.6 | 7.9 | 27.55 | 0.026196 | 21.176 | 347.594 | 1.58E-05 | 0.01885 | 0.61248 | 0.022 | 1536 | 576.13 | 0.24 |
| 15 | 383 | 1304 | 0.17412 | 10.39550 | 30.9 | 23.4 | 7.5 | 27.15 | 0.026167 | 19.315 | 347.362 | 1.58E-05 | 0.01743 | 0.56606 | 0.022 | 1539 | 493.26 | 0.241 |
| 16 | 383 | 1209 | 0.15069 | 8.99620 | 30 | 23.4 | 6.6 | 26.7 | 0.026134 | 16.458 | 347.102 | 1.57E-05 | 0.01616 | 0.52442 | 0.022 | 1544 | 424.5 | 0.241 |
| 17 | 383 | 1103 | 0.13720 | 8.19090 | 29.6 | 23.3 | 6.3 | 26.45 | 0.026116 | 14.303 | 346.957 | 1.57E-05 | 0.01474 | 0.47825 | 0.022 | 1546 | 353.55 | 0.242 |
| 18 | 383 | 1003 | 0.12944 | 7.72780 | 29.5 | 23.4 | 6.1 | 26.45 | 0.026116 | 13.149 | 346.957 | 1.57E-05 | 0.01341 | 0.43489 | 0.022 | 1546 | 292.35 | 0.242 |
| 19 | 383 | 901 | 0.10931 | 6.52570 | 28.4 | 23.4 | 5 | 25.9 | 0.026076 | 11.457 | 346.639 | 1.56E-05 | 0.01204 | 0.3903 | 0.022 | 1551 | 236.25 | 0.242 |
| 20 | 383 | 799 | 0.09563 | 5.70920 | 27.9 | 23.3 | 4.6 | 25.6 | 0.026054 | 9.5399 | 346.465 | 1.56E-05 | 0.01068 | 0.34594 | 0.022 | 1554 | 185.93 | 0.243 |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | dellaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi |

| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |
|--------|--------|--------|--------|---------|---------|
| 0.1473 | 0.0003 | 0.0001 | 0.0004 | 0.14765 | 1.03354 |
| 0.1414 | 0.0003 | 0.0001 | 0.0004 | 0.14177 | 0.9136 |
| 0.0822 | 0.0002 | 0.0001 | 0.0004 | 0.08283 | 1.74925 |
| 0.0804 | 0.0002 | 0.0001 | 0.0004 | 0.08097 | 1.8516 |
| 0.07 | 0.0002 | 0.0001 | 0.0004 | 0.07072 | 1.6274 |
| 0.0673 | 0.0002 | 0.0001 | 0.0004 | 0.06808 | 1.70545 |
| 0.062 | 0.0002 | 0.0001 | 0.0004 | 0.06283 | 1.49757 |
| 0.0599 | 0.0002 | 0.0001 | 0.0004 | 0.06076 | 1.4811 |
| 0.0544 | 0.0002 | 0.0001 | 0.0004 | 0.05531 | 1.32381 |
| 0.0544 | 0.0002 | 0.0001 | 0.0004 | 0.05531 | 1.32345 |
| 0.0729 | 0.0002 | 0.0001 | 0.0004 | 0.07358 | 1.79072 |
| 0.0804 | 0.0002 | 0.0001 | 0.0004 | 0.08097 | 2.06535 |
| 0.0813 | 0.0002 | 0.0001 | 0.0004 | 0.08189 | 1.82478 |
| 0.0895 | 0.0002 | 0.0001 | 0.0004 | 0.09007 | 1.90723 |
| 0.0943 | 0.0002 | 0.0001 | 0.0004 | 0.09481 | 1.83128 |
| 0.1071 | 0.0002 | 0.0001 | 0.0004 | 0.1076 | 1.77099 |
| 0.1122 | 0.0003 | 0.0001 | 0.0004 | 0.11268 | 1.61177 |
| 0.1159 | 0.0003 | 0.0001 | 0.0004 | 0.11635 | 1.52991 |
| 0.1414 | 0.0003 | 0.0001 | 0.0004 | 0.14177 | 1.62431 |
| 0.1537 | 0.0003 | 0.0001 | 0.0004 | 0.15404 | 1.46956 |
| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |

| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |
|------------|---------|-------|------------|--------|--------|---------|---------|
| 0.0276211 | 0.00002 | 3E-05 | 0.0091912 | 0.0034 | 0.0075 | 0.03703 | 3.19164 |
| 0.0275136 | 0.00002 | 3E-05 | 0.0107991 | 0.0034 | 0.0075 | 0.03865 | 2.4125 |
| 0.0253441 | 0.00002 | 3E-05 | 0.0031706 | 0.0034 | 0.0075 | 0.03087 | 22.2279 |
| 0.0253441 | 0.00002 | 3E-05 | 0.0030285 | 0.0034 | 0.0075 | 0.03081 | 24.3178 |
| 0.0246806 | 0.00002 | 3E-05 | 0.0029412 | 0.0034 | 0.0075 | 0.03024 | 25.251 |
| 0.0244249 | 0.00002 | 3E-05 | 0.0025368 | 0.0034 | 0.0075 | 0.02988 | 33.5177 |
| 0.024051 | 0.00002 | 3E-05 | 0.0027278 | 0.0034 | 0.0075 | 0.02964 | 28.7258 |
| 0.0238885 | 0.00002 | 3E-05 | 0.0023923 | 0.0034 | 0.0075 | 0.02939 | 37.0141 |
| 0.0234139 | 0.00002 | 3E-05 | 0.0023213 | 0.0034 | 0.0075 | 0.02899 | 38.7119 |
| 0.0233366 | 0.00002 | 3E-05 | 0.0022432 | 0.0034 | 0.0075 | 0.0289 | 41.3197 |
| 0.0248541 | 0.00002 | 3E-05 | 0.0024876 | 0.0034 | 0.0075 | 0.03021 | 35.2935 |
| 0.0252536 | 0.00002 | 3E-05 | 0.0021505 | 0.0034 | 0.0075 | 0.03044 | 47.6316 |
| 0.0253896 | 0.00002 | 3E-05 | 0.0033179 | 0.0034 | 0.0075 | 0.03097 | 20.3661 |
| 0.0256661 | 0.00002 | 3E-05 | 0.0035461 | 0.0034 | 0.0075 | 0.0313 | 18.031 |
| 0.0260442 | 0.00002 | 3E-05 | 0.0038344 | 0.0034 | 0.0075 | 0.03174 | 15.6572 |
| 0.0264831 | 0.00002 | 3E-05 | 0.0041356 | 0.0034 | 0.0075 | 0.03225 | 13.6911 |
| 0.0267335 | 0.00002 | 3E-05 | 0.0045331 | 0.0034 | 0.0075 | 0.03267 | 11.5505 |
| 0.0267335 | 0.00002 | 3E-05 | 0.004985 | 0.0034 | 0.0075 | 0.03293 | 9.62777 |
| 0.0273012 | 0.00002 | 3E-05 | 0.0055494 | 0.0034 | 0.0075 | 0.03375 | 7.97307 |
| 0.0276211 | 0.00002 | 3E-05 | 0.0062578 | 0.0034 | 0.0075 | 0.0345 | 6.4139 |
| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |

| S/d | | 1.25 | L (m) | | 0.65 | | | | | | | | | | | | | | | |
|-----|--------|-----------|---------|----------|--------|-------|-----------|----------|----------|--------|---------|-----------|---------|---------|-------|------|--------|-------|--|--|
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | | |
| 1 | 676 | 864 | 0.09376 | 5.59603 | 29.5 | 23.3 | 6.2 | 26.4 | 0.026112 | 6.787 | 346.928 | 1.57E-05 | 0.01155 | 0.21223 | 0.039 | 2729 | 122.92 | 0.426 | | |
| 2 | 676 | 1011 | 0.10938 | 6.52809 | 30.6 | 23.3 | 7.3 | 26.95 | 0.026152 | 7.8323 | 347.247 | 1.57E-05 | 0.01351 | 0.24857 | 0.039 | 2720 | 168.07 | 0.425 | | |
| 3 | 676 | 1139 | 0.12504 | 7.46296 | 31.2 | 23.3 | 7.9 | 27.25 | 0.026174 | 9.4509 | 347.42 | 1.58E-05 | 0.01523 | 0.28018 | 0.039 | 2716 | 213.16 | 0.424 | | |
| 4 | 676 | 1272 | 0.14071 | 8.39822 | 31.5 | 23.3 | 8.2 | 27.4 | 0.026185 | 11.525 | 347.507 | 1.58E-05 | 0.017 | 0.31297 | 0.039 | 2713 | 265.75 | 0.424 | | |
| 5 | 676 | 1235 | 0.15640 | 9.33432 | 33.3 | 23.3 | 10 | 28.3 | 0.026251 | 11.646 | 348.027 | 1.59E-05 | 0.01651 | 0.30432 | 0.039 | 2699 | 249.94 | 0.422 | | |
| 6 | 676 | 1348 | 0.17201 | 10.26621 | 33.7 | 23.2 | 10.5 | 28.45 | 0.026262 | 13.411 | 348.113 | 1.59E-05 | 0.01802 | 0.33225 | 0.039 | 2696 | 297.66 | 0.421 | | |
| 7 | 676 | 1438 | 0.18772 | 11.20410 | 33.8 | 23.3 | 10.5 | 28.55 | 0.026269 | 16.969 | 348.171 | 1.59E-05 | 0.01922 | 0.35449 | 0.039 | 2695 | 338.64 | 0.421 | | |
| 8 | 676 | 1529 | 0.20333 | 12.13567 | 34.1 | 23.4 | 10.7 | 28.75 | 0.026284 | 18.374 | 348.286 | 1.59E-05 | 0.02044 | 0.37705 | 0.039 | 2692 | 382.67 | 0.421 | | |
| 9 | 676 | 2456 | 0.20333 | 12.13567 | 29.6 | 23.1 | 6.5 | 26.35 | 0.026108 | 30.45 | 346.899 | 1.57E-05 | 0.03283 | 0.60323 | 0.039 | 2730 | 993.4 | 0.427 | | |
| 10 | 676 | 2556 | 0.21652 | 12.92270 | 30 | 23.1 | 6.9 | 26.55 | 0.026123 | 32.508 | 347.015 | 1.57E-05 | 0.03417 | 0.628 | 0.039 | 2727 | 1075.4 | 0.426 | | |
| 11 | 676 | 1519 | 0.14879 | 8.88025 | 28.5 | 22.9 | 5.6 | 25.7 | 0.026061 | 18.959 | 346.523 | 1.56E-05 | 0.02031 | 0.37268 | 0.039 | 2740 | 380.63 | 0.428 | | |
| 12 | 676 | 1629 | 0.15682 | 9.35933 | 28.5 | 22.9 | 5.6 | 25.7 | 0.026061 | 21.06 | 346.523 | 1.56E-05 | 0.02178 | 0.39967 | 0.039 | 2740 | 437.76 | 0.428 | | |
| 13 | 676 | 1749 | 0.16463 | 9.82595 | 28.5 | 22.9 | 5.6 | 25.7 | 0.026061 | 23.212 | 346.523 | 1.56E-05 | 0.02338 | 0.42911 | 0.039 | 2740 | 504.63 | 0.428 | | |
| 14 | 676 | 1878 | 0.17225 | 10.28055 | 28.6 | 22.9 | 5.7 | 25.75 | 0.026065 | 24.961 | 346.552 | 1.56E-05 | 0.0251 | 0.4608 | 0.039 | 2740 | 581.74 | 0.428 | | |
| 15 | 676 | 1968 | 0.18007 | 10.74730 | 28.7 | 22.9 | 5.8 | 25.8 | 0.026068 | 26.805 | 346.581 | 1.56E-05 | 0.02631 | 0.48293 | 0.039 | 2739 | 638.75 | 0.428 | | |
| 16 | 676 | 2036 | 0.18790 | 11.21430 | 29.2 | 22.9 | 6.3 | 26.05 | 0.026087 | 26.85 | 346.725 | 1.57E-05 | 0.02722 | 0.49982 | 0.039 | 2735 | 683.22 | 0.427 | | |
| 17 | 676 | 2141 | 0.19573 | 11.68170 | 29.2 | 22.8 | 6.4 | 26 | 0.026083 | 28.683 | 346.697 | 1.57E-05 | 0.02862 | 0.52555 | 0.039 | 2736 | 765.6 | 0.427 | | |
| 18 | 676 | 2326 | 0.20415 | 12.18420 | 29.4 | 22.8 | 6.6 | 26.1 | 0.02609 | 30.26 | 346.754 | 1.57E-05 | 0.03109 | 0.57106 | 0.039 | 2734 | 891.59 | 0.427 | | |
| 19 | 676 | 2265 | 0.20415 | 12.18420 | 29.7 | 22.8 | 6.9 | 26.25 | 0.026101 | 28.922 | 346.841 | 1.57E-05 | 0.03028 | 0.55623 | 0.039 | 2732 | 845.11 | 0.427 | | |
| 20 | 676 | 2454 | 0.21136 | 12.61460 | 29.9 | 22.8 | 7.1 | 26.35 | 0.026108 | 30.12 | 346.899 | 1.57E-05 | 0.0328 | 0.60274 | 0.039 | 2730 | 991.78 | 0.427 | | |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | | |

| Ud/T/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |
|--------|--------|--------|--------|---------|---------|
| 0.114 | 0.0003 | 0.0001 | 0.0004 | 0.11449 | 0.77702 |
| 0.0969 | 0.0003 | 0.0001 | 0.0004 | 0.09738 | 0.76271 |
| 0.0895 | 0.0003 | 0.0001 | 0.0004 | 0.09007 | 0.8512 |
| 0.0862 | 0.0003 | 0.0001 | 0.0004 | 0.08681 | 1.00054 |
| 0.0707 | 0.0002 | 0.0001 | 0.0004 | 0.07142 | 0.8317 |
| 0.0673 | 0.0002 | 0.0001 | 0.0004 | 0.06808 | 0.91307 |
| 0.0673 | 0.0002 | 0.0001 | 0.0004 | 0.06808 | 1.08721 |
| 0.0661 | 0.0002 | 0.0001 | 0.0004 | 0.06684 | 1.22812 |
| 0.1088 | 0.0002 | 0.0001 | 0.0004 | 0.10924 | 3.32647 |
| 0.1025 | 0.0002 | 0.0001 | 0.0004 | 0.10297 | 3.34719 |
| 0.1263 | 0.0003 | 0.0001 | 0.0004 | 0.12666 | 2.40147 |
| 0.1263 | 0.0002 | 0.0001 | 0.0004 | 0.12666 | 2.66757 |
| 0.1263 | 0.0002 | 0.0001 | 0.0004 | 0.12666 | 2.9402 |
| 0.1241 | 0.0002 | 0.0001 | 0.0004 | 0.12446 | 3.10652 |
| 0.1219 | 0.0002 | 0.0001 | 0.0004 | 0.12232 | 3.27886 |
| 0.1122 | 0.0002 | 0.0001 | 0.0004 | 0.11268 | 3.02552 |
| 0.1105 | 0.0002 | 0.0001 | 0.0004 | 0.11094 | 3.18204 |
| 0.1071 | 0.0002 | 0.0001 | 0.0004 | 0.1076 | 3.25499 |
| 0.1025 | 0.0002 | 0.0001 | 0.0004 | 0.10297 | 2.97805 |
| 0.0996 | 0.0002 | 0.0001 | 0.0004 | 0.10009 | 3.01485 |
| Ud/T/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |

| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |
|------------|---------|-------|------------|--------|--------|---------|---------|
| 0.0267841 | 0.00002 | 3E-05 | 0.005787 | 0.0034 | 0.0075 | 0.03349 | 4.11714 |
| 0.0262375 | 0.00002 | 3E-05 | 0.0049456 | 0.0034 | 0.0075 | 0.03251 | 5.46355 |
| 0.0259486 | 0.00002 | 3E-05 | 0.0043898 | 0.0034 | 0.0075 | 0.03195 | 6.81077 |
| 0.0258066 | 0.00002 | 3E-05 | 0.0039308 | 0.0034 | 0.0075 | 0.03159 | 8.39632 |
| 0.0249859 | 0.00002 | 3E-05 | 0.0040486 | 0.0034 | 0.0075 | 0.03099 | 7.74534 |
| 0.0248541 | 0.00002 | 3E-05 | 0.0037092 | 0.0034 | 0.0075 | 0.03071 | 9.14155 |
| 0.0247671 | 0.00002 | 3E-05 | 0.0034771 | 0.0034 | 0.0075 | 0.03053 | 10.3396 |
| 0.0245948 | 0.00002 | 3E-05 | 0.0032701 | 0.0034 | 0.0075 | 0.0303 | 11.595 |
| 0.0268349 | 0.00002 | 3E-05 | 0.0020358 | 0.0034 | 0.0075 | 0.03174 | 31.526 |
| 0.0266328 | 0.00002 | 3E-05 | 0.0019562 | 0.0034 | 0.0075 | 0.03154 | 33.9227 |
| 0.0275136 | 0.00002 | 3E-05 | 0.0032916 | 0.0034 | 0.0075 | 0.03272 | 12.4555 |
| 0.0275136 | 0.00002 | 3E-05 | 0.0030694 | 0.0034 | 0.0075 | 0.03264 | 14.2868 |
| 0.0275136 | 0.00002 | 3E-05 | 0.0028588 | 0.0034 | 0.0075 | 0.03256 | 16.4306 |
| 0.0274602 | 0.00002 | 3E-05 | 0.0026624 | 0.0034 | 0.0075 | 0.03245 | 18.8762 |
| 0.027407 | 0.00002 | 3E-05 | 0.0025407 | 0.0034 | 0.0075 | 0.03236 | 20.6723 |
| 0.027144 | 0.00002 | 3E-05 | 0.0024558 | 0.0034 | 0.0075 | 0.03211 | 21.9414 |
| 0.0271962 | 0.00002 | 3E-05 | 0.0023354 | 0.0034 | 0.0075 | 0.03212 | 24.2722 |
| 0.027092 | 0.00002 | 3E-05 | 0.0021496 | 0.0034 | 0.0075 | 0.03198 | 28.5156 |
| 0.0269371 | 0.00002 | 3E-05 | 0.0022075 | 0.0034 | 0.0075 | 0.03187 | 26.9318 |
| 0.0268349 | 0.00002 | 3E-05 | 0.0020375 | 0.0034 | 0.0075 | 0.03174 | 31.4751 |
| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |

| Std | | 1.25 | L (m) | | 0.60000 | | | | | | | | | | | | | |
|-----|--------|-----------|---------|----------|---------|-------|-----------|----------|----------|--------|---------|-----------|---------|---------|-------|------|--------|-------|
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi |
| 1 | 723 | 865 | 0.09387 | 5.60247 | 28.6 | 22.9 | 5.7 | 25.75 | 0.026065 | 7.4128 | 346.552 | 1.56E-05 | 0.01156 | 0.19845 | 0.042 | 2930 | 115.39 | 0.458 |
| 2 | 723 | 1037 | 0.10972 | 6.54870 | 28.9 | 22.9 | 6 | 25.9 | 0.026076 | 9.6178 | 346.639 | 1.56E-05 | 0.01386 | 0.23797 | 0.042 | 2928 | 165.78 | 0.457 |
| 3 | 723 | 1142 | 0.12526 | 7.47588 | 29.4 | 23 | 6.4 | 26.2 | 0.026098 | 11.741 | 346.812 | 1.57E-05 | 0.01527 | 0.26219 | 0.042 | 2922 | 200.9 | 0.457 |
| 4 | 723 | 1244 | 0.14070 | 8.39748 | 29.6 | 22.9 | 6.7 | 26.25 | 0.026101 | 14.149 | 346.841 | 1.57E-05 | 0.01663 | 0.28564 | 0.042 | 2921 | 238.36 | 0.456 |
| 5 | 723 | 1334 | 0.15638 | 9.33320 | 29.6 | 22.8 | 6.8 | 26.2 | 0.026098 | 17.223 | 346.812 | 1.57E-05 | 0.01783 | 0.30627 | 0.042 | 2922 | 274.13 | 0.457 |
| 6 | 723 | 1449 | 0.17206 | 10.26894 | 29.7 | 22.6 | 7.1 | 26.15 | 0.026094 | 19.971 | 346.783 | 1.57E-05 | 0.01937 | 0.33265 | 0.042 | 2923 | 323.47 | 0.457 |
| 7 | 723 | 1548 | 0.18770 | 11.20239 | 30.2 | 22.6 | 7.6 | 26.4 | 0.026112 | 22.188 | 346.928 | 1.57E-05 | 0.02069 | 0.35553 | 0.042 | 2919 | 368.95 | 0.456 |
| 8 | 723 | 1645 | 0.20395 | 12.17259 | 31 | 22.5 | 8.5 | 26.75 | 0.026138 | 23.401 | 347.131 | 1.57E-05 | 0.02199 | 0.37802 | 0.042 | 2913 | 416.26 | 0.455 |
| 9 | 723 | 1757 | 0.21899 | 13.06987 | 31.3 | 22.6 | 8.7 | 26.95 | 0.026152 | 26.343 | 347.247 | 1.57E-05 | 0.02349 | 0.4039 | 0.042 | 2909 | 474.63 | 0.455 |
| 10 | 723 | 1848 | 0.23445 | 13.99278 | 31.6 | 22.6 | 9 | 27.1 | 0.026163 | 29.176 | 347.333 | 1.58E-05 | 0.0247 | 0.42492 | 0.042 | 2907 | 524.86 | 0.454 |
| 11 | 723 | 1943 | 0.23445 | 13.99278 | 31.3 | 22.6 | 8.7 | 26.95 | 0.026152 | 30.195 | 347.247 | 1.57E-05 | 0.02597 | 0.44665 | 0.042 | 2909 | 580.43 | 0.455 |
| 12 | 723 | 2049 | 0.23445 | 13.99278 | 31.2 | 22.6 | 8.6 | 26.9 | 0.026149 | 30.55 | 347.218 | 1.57E-05 | 0.02739 | 0.47098 | 0.042 | 2910 | 645.58 | 0.455 |
| 13 | 723 | 2123 | 0.23857 | 14.23870 | 31.4 | 22.4 | 9 | 26.9 | 0.026149 | 30.227 | 347.218 | 1.57E-05 | 0.02838 | 0.48799 | 0.042 | 2910 | 693.05 | 0.455 |
| 14 | 723 | 950 | 0.08642 | 5.15758 | 27.3 | 22.4 | 4.9 | 24.85 | 0.025999 | 7.3264 | 346.029 | 1.55E-05 | 0.0127 | 0.21762 | 0.042 | 2946 | 139.51 | 0.46 |
| 15 | 723 | 1034 | 0.10165 | 6.06709 | 27.6 | 22.4 | 5.2 | 25 | 0.02601 | 9.5493 | 346.117 | 1.56E-05 | 0.01382 | 0.23692 | 0.042 | 2943 | 165.21 | 0.46 |
| 16 | 723 | 1170 | 0.11709 | 6.98853 | 28 | 22.4 | 5.6 | 25.2 | 0.026024 | 11.759 | 346.233 | 1.56E-05 | 0.01564 | 0.26817 | 0.042 | 2940 | 211.41 | 0.459 |
| 17 | 723 | 2231 | 0.24909 | 14.86632 | 31.8 | 22.4 | 9.4 | 27.1 | 0.026163 | 31.631 | 347.333 | 1.58E-05 | 0.02982 | 0.51299 | 0.042 | 2907 | 764.96 | 0.454 |
| 18 | 723 | 1234 | 0.13337 | 7.95984 | 28.5 | 22.4 | 6.1 | 25.45 | 0.026043 | 13.994 | 346.378 | 1.56E-05 | 0.0165 | 0.28296 | 0.042 | 2935 | 235.02 | 0.459 |
| 19 | 723 | 1377 | 0.14881 | 8.88133 | 28.3 | 22.4 | 5.9 | 25.35 | 0.026035 | 18.017 | 346.32 | 1.56E-05 | 0.01841 | 0.3157 | 0.042 | 2937 | 292.73 | 0.459 |
| 20 | 723 | 1448 | 0.16485 | 9.83909 | 28.8 | 22.4 | 6.4 | 25.6 | 0.026054 | 20.371 | 346.465 | 1.56E-05 | 0.01936 | 0.33211 | 0.042 | 2933 | 323.48 | 0.458 |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi |

| UdT/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |
|--------|--------|--------|--------|---------|---------|
| 0.1241 | 0.0003 | 0.0001 | 0.0004 | 0.12446 | 0.92257 |
| 0.1179 | 0.0003 | 0.0001 | 0.0004 | 0.11827 | 1.13754 |
| 0.1105 | 0.0003 | 0.0001 | 0.0004 | 0.11094 | 1.30249 |
| 0.1055 | 0.0003 | 0.0001 | 0.0004 | 0.10601 | 1.49992 |
| 0.104 | 0.0002 | 0.0001 | 0.0004 | 0.10447 | 1.79921 |
| 0.0996 | 0.0002 | 0.0001 | 0.0004 | 0.10009 | 1.999 |
| 0.093 | 0.0002 | 0.0001 | 0.0004 | 0.09358 | 2.07628 |
| 0.0832 | 0.0002 | 0.0001 | 0.0004 | 0.08379 | 1.96073 |
| 0.0813 | 0.0002 | 0.0001 | 0.0004 | 0.08189 | 2.15724 |
| 0.0786 | 0.0002 | 0.0001 | 0.0004 | 0.0792 | 2.31081 |
| 0.0813 | 0.0002 | 0.0001 | 0.0004 | 0.08189 | 2.47266 |
| 0.0822 | 0.0002 | 0.0001 | 0.0004 | 0.08283 | 2.53042 |
| 0.0786 | 0.0002 | 0.0001 | 0.0004 | 0.0792 | 2.39408 |
| 0.1443 | 0.0003 | 0.0001 | 0.0004 | 0.14465 | 1.05979 |
| 0.136 | 0.0003 | 0.0001 | 0.0004 | 0.13635 | 1.30204 |
| 0.1263 | 0.0003 | 0.0001 | 0.0004 | 0.12666 | 1.48939 |
| 0.0752 | 0.0002 | 0.0001 | 0.0004 | 0.07589 | 2.39281 |
| 0.1159 | 0.0003 | 0.0001 | 0.0004 | 0.11635 | 1.62821 |
| 0.1198 | 0.0003 | 0.0001 | 0.0004 | 0.12027 | 2.16686 |
| 0.1105 | 0.0002 | 0.0001 | 0.0004 | 0.11094 | 2.25991 |
| UdT/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |

| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |
|------------|---------|-------|------------|--------|--------|---------|---------|
| 0.0274602 | 0.00002 | 3E-05 | 0.0057803 | 0.0034 | 0.0075 | 0.03403 | 3.92701 |
| 0.0273012 | 0.00002 | 3E-05 | 0.0048216 | 0.0034 | 0.0075 | 0.0333 | 5.52027 |
| 0.0269885 | 0.00002 | 3E-05 | 0.0043783 | 0.0034 | 0.0075 | 0.03279 | 6.58842 |
| 0.0269371 | 0.00002 | 3E-05 | 0.0040193 | 0.0034 | 0.0075 | 0.03257 | 7.76281 |
| 0.0269885 | 0.00002 | 3E-05 | 0.0037481 | 0.0034 | 0.0075 | 0.03248 | 8.904 |
| 0.0270402 | 0.00002 | 3E-05 | 0.0034507 | 0.0034 | 0.0075 | 0.03239 | 10.4779 |
| 0.0267841 | 0.00002 | 3E-05 | 0.00323 | 0.0034 | 0.0075 | 0.03209 | 11.8383 |
| 0.0264336 | 0.00002 | 3E-05 | 0.0030395 | 0.0034 | 0.0075 | 0.03172 | 13.2035 |
| 0.0262375 | 0.00002 | 3E-05 | 0.0028458 | 0.0034 | 0.0075 | 0.03148 | 14.9431 |
| 0.0260923 | 0.00002 | 3E-05 | 0.0027056 | 0.0034 | 0.0075 | 0.03131 | 16.4352 |
| 0.0262375 | 0.00002 | 3E-05 | 0.0025733 | 0.0034 | 0.0075 | 0.03139 | 18.2199 |
| 0.0262862 | 0.00002 | 3E-05 | 0.0024402 | 0.0034 | 0.0075 | 0.03139 | 20.2636 |
| 0.0262862 | 0.00002 | 3E-05 | 0.0023552 | 0.0034 | 0.0075 | 0.03136 | 21.7356 |
| 0.0284547 | 0.00002 | 3E-05 | 0.0052632 | 0.0034 | 0.0075 | 0.03451 | 4.8144 |
| 0.028284 | 0.00002 | 3E-05 | 0.0048356 | 0.0034 | 0.0075 | 0.03412 | 5.63632 |
| 0.0280595 | 0.00002 | 3E-05 | 0.0042735 | 0.0034 | 0.0075 | 0.03363 | 7.10939 |
| 0.0260923 | 0.00002 | 3E-05 | 0.0022411 | 0.0034 | 0.0075 | 0.03117 | 23.8411 |
| 0.0277839 | 0.00002 | 3E-05 | 0.0040519 | 0.0034 | 0.0075 | 0.03329 | 7.82336 |
| 0.0278935 | 0.00002 | 3E-05 | 0.0036311 | 0.0034 | 0.0075 | 0.03318 | 9.71405 |
| 0.0276211 | 0.00002 | 3E-05 | 0.003453 | 0.0034 | 0.0075 | 0.03288 | 10.6359 |
| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |

| St/d | | 1.25 | | L (m) | | 0.65000 | | | | | | | | | | | | |
|------|--------|-----------|---------|----------|--------|---------|-----------|----------|----------|--------|---------|-----------|---------|---------|-------|------|--------|-------|
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi |
| 1 | 925 | 557 | 0.06242 | 3.72536 | 26.2 | 22.3 | 3.9 | 24.25 | 0.025955 | 4.8106 | 345.681 | 1.55E-05 | 0.00745 | 0.09963 | 0.053 | 3782 | 37.544 | 0.591 |
| 2 | 925 | 656 | 0.07808 | 4.66005 | 27.4 | 22.3 | 5.1 | 24.65 | 0.025999 | 5.7466 | 346.029 | 1.55E-05 | 0.00877 | 0.11746 | 0.053 | 3769 | 51.995 | 0.589 |
| 3 | 925 | 766 | 0.09376 | 5.59568 | 28 | 22.3 | 5.7 | 25.15 | 0.026021 | 7.4073 | 346.204 | 1.56E-05 | 0.01024 | 0.13722 | 0.053 | 3762 | 70.839 | 0.588 |
| 4 | 925 | 955 | 0.12551 | 7.49117 | 30.7 | 22.2 | 8.5 | 26.45 | 0.026116 | 8.8701 | 346.957 | 1.57E-05 | 0.01277 | 0.17145 | 0.053 | 3733 | 109.74 | 0.583 |
| 5 | 925 | 1064 | 0.14116 | 8.42491 | 32 | 22.3 | 9.7 | 27.15 | 0.026167 | 9.812 | 347.362 | 1.58E-05 | 0.01422 | 0.19124 | 0.053 | 3718 | 135.98 | 0.581 |
| 6 | 925 | 1166 | 0.15660 | 9.34630 | 33.1 | 22.3 | 10.8 | 27.7 | 0.026207 | 10.829 | 347.68 | 1.58E-05 | 0.01559 | 0.20977 | 0.053 | 3706 | 163.07 | 0.579 |
| 7 | 925 | 872 | 0.10945 | 6.53227 | 29.3 | 22.2 | 7.1 | 25.75 | 0.026065 | 8.0904 | 346.552 | 1.56E-05 | 0.01166 | 0.15637 | 0.053 | 3749 | 91.659 | 0.586 |
| 8 | 925 | 1240 | 0.17203 | 10.26723 | 34.5 | 22.5 | 12 | 28.5 | 0.026265 | 11.735 | 348.142 | 1.59E-05 | 0.01658 | 0.22338 | 0.053 | 3689 | 184.05 | 0.576 |
| 9 | 925 | 1367 | 0.18809 | 11.22584 | 34.8 | 22.7 | 12.1 | 28.75 | 0.026284 | 13.903 | 348.286 | 1.59E-05 | 0.01827 | 0.24636 | 0.053 | 3683 | 223.54 | 0.575 |
| 10 | 925 | 1454 | 0.20312 | 12.12320 | 35.3 | 22.6 | 12.7 | 28.95 | 0.026298 | 15.44 | 348.402 | 1.59E-05 | 0.01944 | 0.26212 | 0.053 | 3679 | 252.77 | 0.575 |
| 11 | 925 | 1574 | 0.22023 | 13.14390 | 35.4 | 22.8 | 12.6 | 29.1 | 0.026309 | 18.286 | 348.488 | 1.59E-05 | 0.02104 | 0.28382 | 0.053 | 3676 | 296.1 | 0.574 |
| 12 | 925 | 1646 | 0.23445 | 13.99280 | 35.6 | 23 | 12.6 | 29.3 | 0.026324 | 20.713 | 348.604 | 1.6E-05 | 0.022 | 0.29691 | 0.053 | 3671 | 323.64 | 0.574 |
| 13 | 925 | 1756 | 0.25093 | 14.97640 | 35.2 | 23.1 | 12.1 | 29.15 | 0.026313 | 24.718 | 348.517 | 1.59E-05 | 0.02347 | 0.31667 | 0.053 | 3675 | 368.48 | 0.574 |
| 14 | 925 | 1850 | 0.25093 | 14.97640 | 34.1 | 23.1 | 11 | 28.6 | 0.026273 | 27.231 | 348.2 | 1.59E-05 | 0.02473 | 0.33332 | 0.053 | 3686 | 409.56 | 0.576 |
| 15 | 925 | 1969 | 0.25093 | 14.97640 | 33.4 | 23.1 | 10.3 | 28.25 | 0.026247 | 29.11 | 347.998 | 1.59E-05 | 0.02632 | 0.35455 | 0.053 | 3694 | 464.36 | 0.577 |
| 16 | 925 | 2051 | 0.25093 | 14.97640 | 33.4 | 23.2 | 10.2 | 28.3 | 0.026251 | 29.392 | 348.027 | 1.59E-05 | 0.02742 | 0.36935 | 0.053 | 3693 | 503.78 | 0.577 |
| 17 | 925 | 1403 | 0.16484 | 9.83843 | 33 | 23.3 | 9.7 | 28.15 | 0.02624 | 13.343 | 347.94 | 1.59E-05 | 0.01875 | 0.25259 | 0.053 | 3696 | 235.82 | 0.578 |
| 18 | 925 | 1630 | 0.18007 | 10.74749 | 32.2 | 23.3 | 8.9 | 27.75 | 0.026211 | 17.374 | 347.709 | 1.58E-05 | 0.02179 | 0.29327 | 0.053 | 3705 | 318.63 | 0.579 |
| 19 | 925 | 1721 | 0.19511 | 11.64467 | 32.1 | 23.3 | 8.8 | 27.7 | 0.026207 | 20.63 | 347.68 | 1.58E-05 | 0.02301 | 0.30961 | 0.053 | 3706 | 355.25 | 0.579 |
| 20 | 925 | 1838 | 0.21055 | 12.56663 | 31.9 | 23.4 | 8.5 | 27.65 | 0.026203 | 24.878 | 347.651 | 1.58E-05 | 0.02457 | 0.33063 | 0.053 | 3707 | 405.25 | 0.579 |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi |

| UdT/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |
|--------|--------|--------|--------|---------|---------|
| 0.1813 | 0.0003 | 0.0001 | 0.0004 | 0.18158 | 0.87354 |
| 0.1386 | 0.0003 | 0.0001 | 0.0004 | 0.13901 | 0.79882 |
| 0.1241 | 0.0003 | 0.0001 | 0.0004 | 0.12446 | 0.92189 |
| 0.0832 | 0.0003 | 0.0001 | 0.0004 | 0.08379 | 0.74322 |
| 0.0729 | 0.0003 | 0.0001 | 0.0004 | 0.07358 | 0.72199 |
| 0.0655 | 0.0002 | 0.0001 | 0.0004 | 0.06623 | 0.71725 |
| 0.0996 | 0.0003 | 0.0001 | 0.0004 | 0.10009 | 0.8098 |
| 0.0589 | 0.0002 | 0.0001 | 0.0004 | 0.05977 | 0.70142 |
| 0.0584 | 0.0002 | 0.0001 | 0.0004 | 0.05929 | 0.82433 |
| 0.0557 | 0.0002 | 0.0001 | 0.0004 | 0.05657 | 0.87347 |
| 0.0561 | 0.0002 | 0.0001 | 0.0004 | 0.05701 | 1.04242 |
| 0.0561 | 0.0002 | 0.0001 | 0.0004 | 0.05701 | 1.18077 |
| 0.0584 | 0.0002 | 0.0001 | 0.0004 | 0.05929 | 1.46554 |
| 0.0643 | 0.0002 | 0.0001 | 0.0004 | 0.06506 | 1.7716 |
| 0.0687 | 0.0002 | 0.0001 | 0.0004 | 0.06938 | 2.01959 |
| 0.0693 | 0.0002 | 0.0001 | 0.0004 | 0.07004 | 2.05869 |
| 0.0729 | 0.0002 | 0.0001 | 0.0004 | 0.07358 | 0.98184 |
| 0.0794 | 0.0002 | 0.0001 | 0.0004 | 0.08008 | 1.39127 |
| 0.0804 | 0.0002 | 0.0001 | 0.0004 | 0.08097 | 1.67052 |
| 0.0832 | 0.0002 | 0.0001 | 0.0004 | 0.08379 | 2.08449 |
| UdT/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |

| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |
|------------|---------|-------|------------|--------|--------|---------|---------|
| 0.0291588 | 0.00002 | 3E-05 | 0.0089767 | 0.0034 | 0.0075 | 0.03799 | 1.42616 |
| 0.0284547 | 0.00002 | 3E-05 | 0.007622 | 0.0034 | 0.0075 | 0.03623 | 1.88368 |
| 0.0281153 | 0.00002 | 3E-05 | 0.0065274 | 0.0034 | 0.0075 | 0.03509 | 2.48577 |
| 0.0267335 | 0.00002 | 3E-05 | 0.0052356 | 0.0034 | 0.0075 | 0.03309 | 3.63102 |
| 0.0260442 | 0.00002 | 3E-05 | 0.0046992 | 0.0034 | 0.0075 | 0.0322 | 4.37896 |
| 0.0255271 | 0.00002 | 3E-05 | 0.0042882 | 0.0034 | 0.0075 | 0.03155 | 5.14538 |
| 0.0274602 | 0.00002 | 3E-05 | 0.0057339 | 0.0034 | 0.0075 | 0.034 | 3.11643 |
| 0.0248105 | 0.00002 | 3E-05 | 0.0040323 | 0.0034 | 0.0075 | 0.03084 | 5.67584 |
| 0.0245948 | 0.00002 | 3E-05 | 0.0036576 | 0.0034 | 0.0075 | 0.03048 | 6.81276 |
| 0.0244249 | 0.00002 | 3E-05 | 0.0034388 | 0.0034 | 0.0075 | 0.03024 | 7.64307 |
| 0.024299 | 0.00002 | 3E-05 | 0.0031766 | 0.0034 | 0.0075 | 0.03002 | 8.88907 |
| 0.0241331 | 0.00002 | 3E-05 | 0.0030377 | 0.0034 | 0.0075 | 0.02983 | 9.65386 |
| 0.0242573 | 0.00002 | 3E-05 | 0.0028474 | 0.0034 | 0.0075 | 0.02985 | 11.0009 |
| 0.0247238 | 0.00002 | 3E-05 | 0.0027027 | 0.0034 | 0.0075 | 0.03018 | 12.3612 |
| 0.0250301 | 0.00002 | 3E-05 | 0.0025394 | 0.0034 | 0.0075 | 0.03038 | 14.1057 |
| 0.0249859 | 0.00002 | 3E-05 | 0.0024378 | 0.0034 | 0.0075 | 0.03031 | 15.268 |
| 0.025119 | 0.00002 | 3E-05 | 0.0035638 | 0.0034 | 0.0075 | 0.03086 | 7.27705 |
| 0.0254811 | 0.00002 | 3E-05 | 0.0030675 | 0.0034 | 0.0075 | 0.03094 | 9.85896 |
| 0.0255271 | 0.00002 | 3E-05 | 0.0029053 | 0.0034 | 0.0075 | 0.03092 | 10.9831 |
| 0.0255732 | 0.00002 | 3E-05 | 0.0027203 | 0.0034 | 0.0075 | 0.03089 | 12.517 |
| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |

| Std | | 1.25 | L (m) | | 0.65000 | | | | | | | | | | | | | | |
|-----|--------|-----------------------|--------------------|--------------------|--------------------|--------------------|-----------|----------------------|----------|--------|---------|-----------|---------|---------|-------|------|----------------|-------|--|
| # | f (Hz) | V _{mlc} (mV) | V _R (V) | V _H (V) | T _H (C) | T _A (C) | deltaT(C) | T _{avg} (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | R _s | phi | |
| 1 | 1202 | 502 | 0.07809 | 4.66081 | 30.4 | 24 | 6.4 | 27.2 | 0.026171 | 4.5507 | 347.391 | 1.58E-05 | 0.00671 | 0.06944 | 0.069 | 4830 | 23.29 | 0.755 | |
| 2 | 1202 | 554 | 0.08600 | 5.13299 | 31.1 | 24 | 7.1 | 27.55 | 0.026196 | 4.9705 | 347.594 | 1.58E-05 | 0.00741 | 0.07668 | 0.069 | 4820 | 28.34 | 0.753 | |
| 3 | 1202 | 601 | 0.09386 | 5.60186 | 31.6 | 24.1 | 7.5 | 27.85 | 0.026218 | 5.5996 | 347.767 | 1.58E-05 | 0.00803 | 0.08323 | 0.069 | 4811 | 33.327 | 0.752 | |
| 4 | 1202 | 650 | 0.10168 | 6.06882 | 32.2 | 24.2 | 8 | 28.2 | 0.026244 | 6.1553 | 347.969 | 1.59E-05 | 0.00869 | 0.09006 | 0.069 | 4802 | 38.948 | 0.75 | |
| 5 | 1202 | 704 | 0.10951 | 6.53588 | 32.8 | 24.2 | 8.6 | 28.5 | 0.026265 | 6.6356 | 348.142 | 1.59E-05 | 0.00941 | 0.09759 | 0.069 | 4793 | 45.653 | 0.749 | |
| 6 | 1202 | 749 | 0.11735 | 7.00370 | 33.6 | 24.2 | 9.4 | 28.9 | 0.026295 | 6.9833 | 348.373 | 1.59E-05 | 0.01001 | 0.1039 | 0.069 | 4782 | 51.623 | 0.747 | |
| 7 | 1202 | 800 | 0.12506 | 7.46402 | 34.2 | 24.3 | 9.9 | 29.25 | 0.02632 | 7.502 | 348.575 | 1.6E-05 | 0.01069 | 0.11104 | 0.069 | 4772 | 58.841 | 0.746 | |
| 8 | 1202 | 903 | 0.13289 | 7.93145 | 34 | 24.3 | 9.7 | 29.15 | 0.026313 | 8.6481 | 348.517 | 1.59E-05 | 0.01207 | 0.12532 | 0.069 | 4775 | 74.988 | 0.746 | |
| 9 | 1202 | 949 | 0.14085 | 8.40668 | 34.3 | 24.2 | 10.1 | 29.25 | 0.02632 | 9.3281 | 348.575 | 1.6E-05 | 0.01269 | 0.13172 | 0.069 | 4772 | 82.8 | 0.746 | |
| 10 | 1202 | 998 | 0.14874 | 8.87754 | 34.9 | 24.2 | 10.7 | 29.55 | 0.026342 | 9.8108 | 348.748 | 1.6E-05 | 0.01334 | 0.13859 | 0.069 | 4764 | 91.501 | 0.744 | |
| 11 | 1202 | 1048 | 0.15656 | 9.34395 | 35.1 | 23.9 | 11.2 | 29.5 | 0.026338 | 10.385 | 348.719 | 1.6E-05 | 0.01401 | 0.14552 | 0.069 | 4765 | 100.91 | 0.745 | |
| 12 | 1202 | 1101 | 0.16428 | 9.80463 | 36.9 | 24 | 12.9 | 30.45 | 0.026407 | 9.9015 | 349.266 | 1.61E-05 | 0.01472 | 0.15312 | 0.069 | 4739 | 111.11 | 0.74 | |
| 13 | 1202 | 1148 | 0.17205 | 10.26875 | 37.4 | 24 | 13.4 | 30.7 | 0.026426 | 10.449 | 349.409 | 1.61E-05 | 0.01535 | 0.15972 | 0.069 | 4732 | 120.72 | 0.739 | |
| 14 | 1202 | 1200 | 0.17992 | 10.73818 | 38.6 | 24 | 14.6 | 31.3 | 0.026469 | 10.489 | 349.754 | 1.61E-05 | 0.01604 | 0.16712 | 0.069 | 4716 | 131.71 | 0.737 | |
| 15 | 1202 | 1247 | 0.18774 | 11.20505 | 39.7 | 24.1 | 15.6 | 31.9 | 0.026513 | 10.651 | 350.099 | 1.62E-05 | 0.01667 | 0.17384 | 0.068 | 4699 | 142.01 | 0.734 | |
| 16 | 1202 | 1300 | 0.19547 | 11.66650 | 39.8 | 24.1 | 15.7 | 31.95 | 0.026516 | 11.471 | 350.127 | 1.62E-05 | 0.01738 | 0.18124 | 0.068 | 4698 | 154.32 | 0.734 | |
| 17 | 1202 | 1655 | 0.20330 | 12.13360 | 40.4 | 24.1 | 16.3 | 32.25 | 0.026538 | 11.942 | 350.299 | 1.62E-05 | 0.02212 | 0.23085 | 0.068 | 4690 | 249.93 | 0.733 | |
| 18 | 1202 | 1405 | 0.20151 | 12.02710 | 40.7 | 24.2 | 16.5 | 32.45 | 0.026553 | 11.585 | 350.414 | 1.63E-05 | 0.01878 | 0.19604 | 0.068 | 4684 | 180.03 | 0.732 | |
| 19 | 1202 | 1448 | 0.21956 | 13.10400 | 41.7 | 24.3 | 17.4 | 33 | 0.026592 | 13.021 | 350.729 | 1.63E-05 | 0.01936 | 0.20223 | 0.068 | 4669 | 190.96 | 0.73 | |
| 20 | 1202 | 1504 | 0.22719 | 13.55980 | 42.4 | 24.3 | 18.1 | 33.35 | 0.026618 | 13.391 | 350.93 | 1.63E-05 | 0.0201 | 0.21017 | 0.068 | 4660 | 205.84 | 0.728 | |
| # | f (Hz) | V _{mlc} (mV) | V _R (V) | V _H (V) | T _H (C) | T _A (C) | deltaT(C) | T _{avg} (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | R _s | phi | |

| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |
|--------|--------|--------|--------|---------|---------|
| 0.1105 | 0.0003 | 0.0001 | 0.0004 | 0.11094 | 0.50485 |
| 0.0996 | 0.0003 | 0.0001 | 0.0004 | 0.10009 | 0.49751 |
| 0.0943 | 0.0003 | 0.0001 | 0.0004 | 0.09481 | 0.5309 |
| 0.0884 | 0.0003 | 0.0001 | 0.0004 | 0.08895 | 0.54753 |
| 0.0822 | 0.0003 | 0.0001 | 0.0004 | 0.08283 | 0.54962 |
| 0.0752 | 0.0003 | 0.0001 | 0.0004 | 0.07589 | 0.52842 |
| 0.0714 | 0.0003 | 0.0001 | 0.0004 | 0.07212 | 0.54107 |
| 0.0729 | 0.0003 | 0.0001 | 0.0004 | 0.07358 | 0.63634 |
| 0.07 | 0.0003 | 0.0001 | 0.0004 | 0.07072 | 0.65971 |
| 0.0661 | 0.0003 | 0.0001 | 0.0004 | 0.06684 | 0.65575 |
| 0.0631 | 0.0002 | 0.0001 | 0.0004 | 0.06392 | 0.66385 |
| 0.0548 | 0.0002 | 0.0001 | 0.0004 | 0.05572 | 0.55173 |
| 0.0528 | 0.0002 | 0.0001 | 0.0004 | 0.05371 | 0.5612 |
| 0.0484 | 0.0002 | 0.0001 | 0.0004 | 0.04946 | 0.51778 |
| 0.0453 | 0.0002 | 0.0001 | 0.0004 | 0.04642 | 0.49444 |
| 0.045 | 0.0002 | 0.0001 | 0.0004 | 0.04614 | 0.52928 |
| 0.0434 | 0.0002 | 0.0001 | 0.0004 | 0.04452 | 0.53167 |
| 0.0429 | 0.0002 | 0.0001 | 0.0004 | 0.04401 | 0.50983 |
| 0.0406 | 0.0002 | 0.0001 | 0.0004 | 0.04185 | 0.54499 |
| 0.0391 | 0.0002 | 0.0001 | 0.0004 | 0.04033 | 0.54005 |
| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |

| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |
|------------|---------|-------|------------|--------|--------|---------|---------|
| 0.0259963 | 0.00002 | 3E-05 | 0.0099602 | 0.0034 | 0.0075 | 0.03665 | 0.85353 |
| 0.0256661 | 0.00002 | 3E-05 | 0.0090253 | 0.0034 | 0.0075 | 0.03543 | 1.00397 |
| 0.0253896 | 0.00002 | 3E-05 | 0.0083195 | 0.0034 | 0.0075 | 0.03452 | 1.15058 |
| 0.0250745 | 0.00002 | 3E-05 | 0.0076923 | 0.0034 | 0.0075 | 0.0337 | 1.31264 |
| 0.0248105 | 0.00002 | 3E-05 | 0.0071023 | 0.0034 | 0.0075 | 0.03298 | 1.5057 |
| 0.0244671 | 0.00002 | 3E-05 | 0.0066756 | 0.0034 | 0.0075 | 0.03236 | 1.67067 |
| 0.0241744 | 0.00002 | 3E-05 | 0.00625 | 0.0034 | 0.0075 | 0.0318 | 1.871 |
| 0.0242573 | 0.00002 | 3E-05 | 0.0055371 | 0.0034 | 0.0075 | 0.03133 | 2.34924 |
| 0.0241744 | 0.00002 | 3E-05 | 0.0052687 | 0.0034 | 0.0075 | 0.03108 | 2.57331 |
| 0.0239289 | 0.00002 | 3E-05 | 0.00501 | 0.0034 | 0.0075 | 0.03072 | 2.81051 |
| 0.0239695 | 0.00002 | 3E-05 | 0.004771 | 0.0034 | 0.0075 | 0.03059 | 3.08738 |
| 0.0232217 | 0.00002 | 3E-05 | 0.0045413 | 0.0034 | 0.0075 | 0.02987 | 3.31881 |
| 0.0230326 | 0.00002 | 3E-05 | 0.0043554 | 0.0034 | 0.0075 | 0.02961 | 3.57475 |
| 0.0225911 | 0.00002 | 3E-05 | 0.0041667 | 0.0034 | 0.0075 | 0.02916 | 3.84048 |
| 0.0221661 | 0.00002 | 3E-05 | 0.0040096 | 0.0034 | 0.0075 | 0.02874 | 4.08172 |
| 0.0221315 | 0.00002 | 3E-05 | 0.0038462 | 0.0034 | 0.0075 | 0.02863 | 4.41755 |
| 0.0219256 | 0.00002 | 3E-05 | 0.0030211 | 0.0034 | 0.0075 | 0.02807 | 7.01437 |
| 0.0217904 | 0.00002 | 3E-05 | 0.0035587 | 0.0034 | 0.0075 | 0.02821 | 5.07912 |
| 0.0214273 | 0.00002 | 3E-05 | 0.003453 | 0.0034 | 0.0075 | 0.02788 | 5.32384 |
| 0.0212024 | 0.00002 | 3E-05 | 0.0033245 | 0.0034 | 0.0075 | 0.02764 | 5.69012 |
| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |

| S/d | 1.25 | L (m) | | | | | | | | | | | | | | | | | | |
|-----|--------|-----------|---------|----------|--------|-------|-----------|----------|----------|--------|---------|-----------|---------|---------|-------|------|--------|-------|--|--|
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | | |
| 1 | 1461 | 100 | 0.05462 | 3.26000 | 29.5 | 23.7 | 5.8 | 26.6 | 0.026127 | 2.4608 | 347.044 | 1.57E-05 | 0.00134 | 0.01137 | 0.084 | 5891 | 0.7616 | 0.921 | | |
| 2 | 1461 | 150 | 0.06352 | 3.79116 | 31.2 | 23.7 | 7.5 | 27.45 | 0.026189 | 2.5676 | 347.536 | 1.58E-05 | 0.00201 | 0.01708 | 0.084 | 5862 | 1.7097 | 0.916 | | |
| 3 | 1461 | 202 | 0.07033 | 4.19783 | 31.4 | 23.7 | 7.7 | 27.55 | 0.026196 | 3.0653 | 347.594 | 1.58E-05 | 0.0027 | 0.023 | 0.084 | 5859 | 3.0998 | 0.915 | | |
| 4 | 1461 | 250 | 0.07812 | 4.66223 | 32.7 | 23.7 | 9 | 28.2 | 0.026244 | 3.229 | 347.969 | 1.59E-05 | 0.00334 | 0.0285 | 0.084 | 5836 | 4.7401 | 0.912 | | |
| 5 | 1461 | 300 | 0.08594 | 5.12919 | 33.7 | 23.7 | 10 | 28.7 | 0.02628 | 3.5126 | 348.258 | 1.59E-05 | 0.00401 | 0.03423 | 0.084 | 5819 | 6.8171 | 0.909 | | |
| 6 | 1461 | 347 | 0.09376 | 5.59607 | 35.2 | 23.7 | 11.5 | 29.45 | 0.026335 | 3.6282 | 348.69 | 1.6E-05 | 0.00464 | 0.03964 | 0.084 | 5794 | 9.1031 | 0.905 | | |
| 7 | 1461 | 401 | 0.10161 | 6.06426 | 35.1 | 23.7 | 11.4 | 29.4 | 0.026331 | 4.2987 | 348.661 | 1.6E-05 | 0.00536 | 0.0458 | 0.084 | 5795 | 12.158 | 0.906 | | |
| 8 | 1461 | 450 | 0.10951 | 6.53578 | 35.7 | 23.7 | 12 | 29.7 | 0.026353 | 4.7396 | 348.834 | 1.6E-05 | 0.00602 | 0.05143 | 0.084 | 5785 | 15.3 | 0.904 | | |
| 9 | 1461 | 497 | 0.11734 | 7.00322 | 36 | 23.7 | 12.3 | 29.85 | 0.026364 | 5.3068 | 348.92 | 1.6E-05 | 0.00664 | 0.05681 | 0.084 | 5780 | 18.655 | 0.903 | | |
| 10 | 1461 | 548 | 0.12518 | 7.47142 | 36.7 | 23.7 | 13 | 30.2 | 0.026389 | 5.7094 | 349.122 | 1.6E-05 | 0.00733 | 0.06268 | 0.083 | 5768 | 22.66 | 0.901 | | |
| 11 | 1461 | 598 | 0.13293 | 7.93373 | 37.3 | 23.7 | 13.6 | 30.5 | 0.026411 | 6.1487 | 349.294 | 1.61E-05 | 0.00799 | 0.06843 | 0.083 | 5758 | 26.964 | 0.9 | | |
| 12 | 1461 | 647 | 0.14077 | 8.40193 | 37.8 | 23.7 | 14.1 | 30.75 | 0.026429 | 6.6467 | 349.438 | 1.61E-05 | 0.00865 | 0.07407 | 0.083 | 5750 | 31.544 | 0.898 | | |
| 13 | 1461 | 699 | 0.14881 | 8.88134 | 38.3 | 23.7 | 14.6 | 31 | 0.026447 | 7.1676 | 349.582 | 1.61E-05 | 0.00934 | 0.08005 | 0.083 | 5742 | 36.795 | 0.897 | | |
| 14 | 1461 | 747 | 0.15643 | 9.33634 | 38.7 | 23.7 | 15 | 31.2 | 0.026462 | 7.7054 | 349.697 | 1.61E-05 | 0.00999 | 0.08558 | 0.083 | 5735 | 42.001 | 0.896 | | |
| 15 | 1461 | 799 | 0.16425 | 9.80293 | 38.2 | 23.7 | 14.5 | 30.95 | 0.026444 | 8.7937 | 349.553 | 1.61E-05 | 0.01068 | 0.0915 | 0.083 | 5743 | 48.082 | 0.897 | | |
| 16 | 1461 | 850 | 0.17207 | 10.26989 | 39.3 | 23.7 | 15.6 | 31.5 | 0.026484 | 8.9574 | 349.869 | 1.62E-05 | 0.01136 | 0.09743 | 0.083 | 5725 | 54.341 | 0.895 | | |
| 17 | 1461 | 903 | 0.17989 | 10.73666 | 40.2 | 23.7 | 16.5 | 31.95 | 0.026516 | 9.2447 | 350.127 | 1.62E-05 | 0.01207 | 0.10358 | 0.083 | 5710 | 61.259 | 0.892 | | |
| 18 | 1461 | 944 | 0.18769 | 11.20182 | 41.6 | 23.8 | 17.8 | 32.7 | 0.026571 | 9.309 | 350.557 | 1.63E-05 | 0.01262 | 0.10841 | 0.083 | 5685 | 66.823 | 0.888 | | |
| 19 | 1461 | 1009 | 0.19550 | 11.66841 | 40.9 | 23.8 | 17.1 | 32.35 | 0.026545 | 10.524 | 350.357 | 1.62E-05 | 0.01349 | 0.11581 | 0.083 | 5697 | 76.409 | 0.89 | | |
| 20 | 1461 | 1140 | 0.20333 | 12.13556 | 41.7 | 23.8 | 17.9 | 32.75 | 0.026574 | 10.863 | 350.586 | 1.63E-05 | 0.01524 | 0.13093 | 0.083 | 5684 | 97.44 | 0.888 | | |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | | |

| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |
|--------|--------|--------|--------|---------|---------|
| 0.1219 | 0.0003 | 0.0001 | 0.0004 | 0.12232 | 0.30101 |
| 0.0943 | 0.0003 | 0.0001 | 0.0004 | 0.09481 | 0.24343 |
| 0.0918 | 0.0003 | 0.0001 | 0.0004 | 0.09238 | 0.28316 |
| 0.0786 | 0.0003 | 0.0001 | 0.0004 | 0.0792 | 0.25575 |
| 0.0707 | 0.0003 | 0.0001 | 0.0004 | 0.07142 | 0.25085 |
| 0.0615 | 0.0003 | 0.0001 | 0.0004 | 0.0623 | 0.22603 |
| 0.062 | 0.0003 | 0.0001 | 0.0004 | 0.06283 | 0.27009 |
| 0.0589 | 0.0003 | 0.0001 | 0.0004 | 0.05977 | 0.28329 |
| 0.0575 | 0.0003 | 0.0001 | 0.0004 | 0.05835 | 0.30967 |
| 0.0544 | 0.0003 | 0.0001 | 0.0004 | 0.05531 | 0.31577 |
| 0.052 | 0.0003 | 0.0001 | 0.0004 | 0.05295 | 0.32557 |
| 0.0501 | 0.0003 | 0.0001 | 0.0004 | 0.05114 | 0.33991 |
| 0.0484 | 0.0003 | 0.0001 | 0.0004 | 0.04946 | 0.35448 |
| 0.0471 | 0.0002 | 0.0001 | 0.0004 | 0.04819 | 0.37134 |
| 0.0488 | 0.0002 | 0.0001 | 0.0004 | 0.04978 | 0.43778 |
| 0.0453 | 0.0002 | 0.0001 | 0.0004 | 0.04642 | 0.41581 |
| 0.0429 | 0.0002 | 0.0001 | 0.0004 | 0.04401 | 0.40685 |
| 0.0397 | 0.0002 | 0.0001 | 0.0004 | 0.04097 | 0.38137 |
| 0.0414 | 0.0002 | 0.0001 | 0.0004 | 0.04255 | 0.44777 |
| 0.0395 | 0.0002 | 0.0001 | 0.0004 | 0.04075 | 0.4427 |
| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |

| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |
|------------|---------|-------|------------|--------|--------|---------|---------|
| 0.0265827 | 0.00002 | 3E-05 | 0.05 | 0.0034 | 0.0075 | 0.10477 | 0.07979 |
| 0.0257596 | 0.00002 | 3E-05 | 0.0333333 | 0.0034 | 0.0075 | 0.07334 | 0.12539 |
| 0.0256661 | 0.00002 | 3E-05 | 0.0247525 | 0.0034 | 0.0075 | 0.05814 | 0.18021 |
| 0.0250745 | 0.00002 | 3E-05 | 0.02 | 0.0034 | 0.0075 | 0.04999 | 0.23697 |
| 0.0246376 | 0.00002 | 3E-05 | 0.0166667 | 0.0034 | 0.0075 | 0.04459 | 0.304 |
| 0.0240102 | 0.00002 | 3E-05 | 0.0144092 | 0.0034 | 0.0075 | 0.04096 | 0.37283 |
| 0.024051 | 0.00002 | 3E-05 | 0.0124688 | 0.0034 | 0.0075 | 0.03835 | 0.46628 |
| 0.0238081 | 0.00002 | 3E-05 | 0.0111111 | 0.0034 | 0.0075 | 0.03648 | 0.5582 |
| 0.0236884 | 0.00002 | 3E-05 | 0.0100604 | 0.0034 | 0.0075 | 0.03516 | 0.65598 |
| 0.0234139 | 0.00002 | 3E-05 | 0.0091241 | 0.0034 | 0.0075 | 0.03394 | 0.76901 |
| 0.0231836 | 0.00002 | 3E-05 | 0.0083612 | 0.0034 | 0.0075 | 0.03298 | 0.88922 |
| 0.0229951 | 0.00002 | 3E-05 | 0.007728 | 0.0034 | 0.0075 | 0.03222 | 1.01633 |
| 0.0228097 | 0.00002 | 3E-05 | 0.0071531 | 0.0034 | 0.0075 | 0.03155 | 1.16087 |
| 0.0226635 | 0.00002 | 3E-05 | 0.0066934 | 0.0034 | 0.0075 | 0.03104 | 1.30356 |
| 0.0228465 | 0.00002 | 3E-05 | 0.0062578 | 0.0034 | 0.0075 | 0.03081 | 1.48124 |
| 0.0224476 | 0.00002 | 3E-05 | 0.0058824 | 0.0034 | 0.0075 | 0.03021 | 1.64172 |
| 0.0221315 | 0.00002 | 3E-05 | 0.0055371 | 0.0034 | 0.0075 | 0.02971 | 1.82022 |
| 0.0216239 | 0.00002 | 3E-05 | 0.0052966 | 0.0034 | 0.0075 | 0.02916 | 1.9485 |
| 0.0218578 | 0.00002 | 3E-05 | 0.0049554 | 0.0034 | 0.0075 | 0.02909 | 2.223 |
| 0.0215908 | 0.00002 | 3E-05 | 0.004386 | 0.0034 | 0.0075 | 0.02852 | 2.77927 |
| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |

| S/d | 1.5 | L (m) | | 0.24000 | | | | | | | | | | | | | | | |
|-----|--------|-----------|---------|----------|--------|-------|-----------|----------|----------|-------|---------|-----------|---------|---------|----------|----------|---------|---------|--|
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | |
| 1 | 383 | 402 | 0.13827 | 8.25489 | 37 | 25.2 | 11.8 | 31.1 | 0.026455 | 7.657 | 349.639 | 1.613E-05 | 0.00537 | 0.1756 | 0.021853 | 1504.297 | 46.4116 | 0.94019 | |
| 2 | 383 | 502 | 0.14735 | 8.79721 | 36.9 | 24.4 | 12.5 | 30.65 | 0.026422 | 8.219 | 349.381 | 1.608E-05 | 0.00671 | 0.2192 | 0.021869 | 1508.233 | 72.4558 | 0.94265 | |
| 3 | 383 | 601 | 0.15565 | 9.29271 | 35.2 | 24.4 | 10.8 | 29.8 | 0.02636 | 10.64 | 348.892 | 1.6E-05 | 0.00803 | 0.262 | 0.021899 | 1515.713 | 104.075 | 0.94732 | |
| 4 | 383 | 703 | 0.16421 | 9.80332 | 35.9 | 24.3 | 11.6 | 30.1 | 0.026382 | 11.02 | 349.064 | 1.603E-05 | 0.0094 | 0.3067 | 0.021889 | 1513.066 | 142.292 | 0.94567 | |
| 5 | 383 | 800 | 0.17261 | 10.30523 | 35.4 | 24.4 | 11 | 29.9 | 0.026367 | 12.84 | 348.949 | 1.601E-05 | 0.01069 | 0.3489 | 0.021896 | 1514.829 | 184.36 | 0.94677 | |
| 6 | 383 | 902 | 0.18171 | 10.84818 | 34.5 | 24.4 | 10.1 | 29.45 | 0.026335 | 15.62 | 348.69 | 1.597E-05 | 0.01206 | 0.393 | 0.021912 | 1518.81 | 234.636 | 0.94926 | |
| 7 | 383 | 1006 | 0.19035 | 11.36426 | 34.5 | 24.4 | 10.1 | 29.45 | 0.026335 | 17.03 | 348.69 | 1.597E-05 | 0.01345 | 0.4384 | 0.021912 | 1518.81 | 291.862 | 0.94926 | |
| 8 | 383 | 1098 | 0.19899 | 11.88023 | 34.2 | 24.4 | 9.8 | 29.3 | 0.026324 | 19.19 | 348.604 | 1.596E-05 | 0.01468 | 0.4783 | 0.021917 | 1520.141 | 347.818 | 0.95009 | |
| 9 | 383 | 1205 | 0.20742 | 12.38318 | 34.2 | 24.5 | 9.7 | 29.35 | 0.026327 | 21.06 | 348.632 | 1.596E-05 | 0.01611 | 0.525 | 0.021916 | 1519.697 | 418.858 | 0.94981 | |
| 10 | 383 | 1301 | 0.21629 | 12.91290 | 34.2 | 24.6 | 9.6 | 29.4 | 0.026331 | 23.14 | 348.661 | 1.597E-05 | 0.01739 | 0.5669 | 0.021914 | 1519.254 | 488.193 | 0.94953 | |
| 11 | 383 | 1402 | 0.22480 | 13.42110 | 33.4 | 24.4 | 9 | 28.9 | 0.026295 | 26.7 | 348.373 | 1.592E-05 | 0.01874 | 0.6104 | 0.021932 | 1523.699 | 567.664 | 0.95231 | |
| 12 | 383 | 1503 | 0.23405 | 13.97340 | 33.5 | 24.6 | 8.9 | 29.05 | 0.026305 | 29.25 | 348.459 | 1.593E-05 | 0.02009 | 0.6545 | 0.021927 | 1522.363 | 652.14 | 0.95148 | |
| 13 | 383 | 1596 | 0.24214 | 14.45640 | 33.4 | 24.6 | 8.8 | 29 | 0.026302 | 31.67 | 348.431 | 1.593E-05 | 0.02133 | 0.6949 | 0.021928 | 1522.808 | 735.434 | 0.95176 | |
| 14 | 383 | 1603 | 0.25115 | 14.99400 | 34 | 24.6 | 9.4 | 29.3 | 0.026324 | 31.87 | 348.604 | 1.596E-05 | 0.02143 | 0.6983 | 0.021917 | 1520.141 | 741.335 | 0.95009 | |
| 15 | 383 | 1696 | 0.25980 | 15.51060 | 34.2 | 24.5 | 9.7 | 29.35 | 0.026327 | 33.04 | 348.632 | 1.596E-05 | 0.02267 | 0.7389 | 0.021916 | 1519.697 | 829.744 | 0.94981 | |
| 16 | 383 | 1800 | 0.26823 | 16.01355 | 34.2 | 24.7 | 9.5 | 29.45 | 0.026335 | 35.95 | 348.69 | 1.597E-05 | 0.02406 | 0.7844 | 0.021912 | 1518.81 | 934.388 | 0.94926 | |
| 17 | 383 | 1894 | 0.27757 | 16.57110 | 34.3 | 24.5 | 9.8 | 29.4 | 0.026331 | 37.33 | 348.661 | 1.597E-05 | 0.02532 | 0.8252 | 0.021914 | 1519.254 | 1034.66 | 0.94953 | |
| 18 | 383 | 2005 | 0.28624 | 17.08870 | 34.4 | 24.5 | 9.9 | 29.45 | 0.026335 | 39.29 | 348.69 | 1.597E-05 | 0.0268 | 0.8737 | 0.021912 | 1518.81 | 1159.34 | 0.94926 | |
| 19 | 383 | 2104 | 0.29471 | 17.59480 | 34.8 | 24.4 | 10.4 | 29.6 | 0.026345 | 39.63 | 348.776 | 1.599E-05 | 0.02813 | 0.917 | 0.021907 | 1517.481 | 1276.17 | 0.94843 | |
| 20 | 383 | 2200 | 0.30289 | 18.08310 | 35 | 24.5 | 10.5 | 29.75 | 0.026356 | 41.45 | 348.863 | 1.6E-05 | 0.02941 | 0.9591 | 0.021901 | 1516.154 | 1394.75 | 0.9476 | |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | |

| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |
|-------|---------|----------|-------|--------|------|
| 0.06 | 0.00025 | 0.00012 | 4E-04 | 0.0608 | 0.47 |
| 0.057 | 0.00025 | 0.00012 | 4E-04 | 0.0574 | 0.47 |
| 0.065 | 0.00025 | 0.000119 | 4E-04 | 0.0662 | 0.7 |
| 0.061 | 0.00025 | 0.000119 | 4E-04 | 0.0618 | 0.68 |
| 0.064 | 0.00024 | 0.000119 | 4E-04 | 0.0651 | 0.84 |
| 0.07 | 0.00024 | 0.000119 | 4E-04 | 0.0707 | 1.1 |
| 0.07 | 0.00024 | 0.000119 | 4E-04 | 0.0707 | 1.2 |
| 0.072 | 0.00024 | 0.000118 | 4E-04 | 0.0728 | 1.4 |
| 0.073 | 0.00024 | 0.000118 | 4E-04 | 0.0736 | 1.55 |
| 0.074 | 0.00024 | 0.000118 | 4E-04 | 0.0743 | 1.72 |
| 0.079 | 0.00024 | 0.000118 | 4E-04 | 0.0792 | 2.11 |
| 0.079 | 0.00024 | 0.000118 | 4E-04 | 0.0801 | 2.34 |
| 0.08 | 0.00023 | 0.000118 | 4E-04 | 0.081 | 2.56 |
| 0.075 | 0.00023 | 0.000118 | 4E-04 | 0.0759 | 2.42 |
| 0.073 | 0.00023 | 0.000118 | 4E-04 | 0.0736 | 2.43 |
| 0.074 | 0.00023 | 0.000117 | 4E-04 | 0.0751 | 2.7 |
| 0.072 | 0.00023 | 0.000117 | 4E-04 | 0.0728 | 2.72 |
| 0.071 | 0.00023 | 0.000117 | 4E-04 | 0.0721 | 2.83 |
| 0.068 | 0.00023 | 0.000117 | 4E-04 | 0.0687 | 2.72 |
| 0.067 | 0.00023 | 0.000117 | 4E-04 | 0.0681 | 2.82 |
| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |

| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |
|------------|---------|---------|------------|--------|---------|-----------|---------|
| 0.0227363 | 0.00002 | 3.1E-05 | 0.0124378 | 0.0034 | 0.00749 | 0.0374991 | 1.74039 |
| 0.0230701 | 0.00002 | 3.1E-05 | 0.0099602 | 0.0034 | 0.00749 | 0.0346338 | 2.50942 |
| 0.0237282 | 0.00002 | 3.1E-05 | 0.0083195 | 0.0034 | 0.00749 | 0.0333216 | 3.46794 |
| 0.0234917 | 0.00002 | 3.1E-05 | 0.0071124 | 0.0034 | 0.00749 | 0.0320101 | 4.55477 |
| 0.0236488 | 0.00002 | 3.1E-05 | 0.00625 | 0.0034 | 0.00749 | 0.0314001 | 5.78893 |
| 0.0240102 | 0.00002 | 3.1E-05 | 0.0055432 | 0.0034 | 0.00749 | 0.0311423 | 7.30713 |
| 0.0240102 | 0.00002 | 3.1E-05 | 0.0049702 | 0.0034 | 0.00749 | 0.030753 | 8.97564 |
| 0.0241331 | 0.00002 | 3.1E-05 | 0.0045537 | 0.0034 | 0.00749 | 0.0305908 | 10.64 |
| 0.024092 | 0.00002 | 3.1E-05 | 0.0041494 | 0.0034 | 0.00749 | 0.0303272 | 12.7028 |
| 0.024051 | 0.00002 | 3.1E-05 | 0.0038432 | 0.0034 | 0.00749 | 0.0301327 | 14.7106 |
| 0.0244671 | 0.00002 | 3.1E-05 | 0.0035663 | 0.0034 | 0.00749 | 0.0303309 | 17.2174 |
| 0.0243408 | 0.00002 | 3.1E-05 | 0.0033267 | 0.0034 | 0.00749 | 0.0301196 | 19.6422 |
| 0.0243828 | 0.00002 | 3.1E-05 | 0.0031328 | 0.0034 | 0.00749 | 0.0300703 | 22.1147 |
| 0.0241331 | 0.00002 | 3.1E-05 | 0.0031192 | 0.0034 | 0.00749 | 0.0298625 | 22.1381 |
| 0.024092 | 0.00002 | 3.1E-05 | 0.0029481 | 0.0034 | 0.00749 | 0.0297596 | 24.6929 |
| 0.0240102 | 0.00002 | 3.1E-05 | 0.0027778 | 0.0034 | 0.00749 | 0.0296277 | 27.6838 |
| 0.024051 | 0.00002 | 3.1E-05 | 0.0026399 | 0.0034 | 0.00749 | 0.0296104 | 30.6366 |
| 0.0240102 | 0.00002 | 3.1E-05 | 0.0024938 | 0.0034 | 0.00749 | 0.0295264 | 34.2312 |
| 0.0238885 | 0.00002 | 3.1E-05 | 0.0023764 | 0.0034 | 0.00749 | 0.0293887 | 37.505 |
| 0.0237681 | 0.00002 | 3.1E-05 | 0.0022727 | 0.0034 | 0.00749 | 0.029258 | 40.8077 |
| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |

| S/d 1.5 | | L (m) 0.65 | | | | | | | | | | | | | | | | | |
|---------|--------|------------|---------|----------|--------|-------|-----------|----------|----------|-------|---------|-----------|---------|---------|----------|----------|---------|---------|--|
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | |
| 1 | 676 | 923.7 | 0.20355 | 12.17028 | 40.3 | 26 | 14.3 | 33.15 | 0.026603 | 13.64 | 350.815 | 1.632E-05 | 0.01235 | 0.2294 | 0.038441 | 2623.836 | 138.121 | 1.6399 | |
| 2 | 676 | 1222.3 | 0.24323 | 14.54290 | 37.8 | 24.8 | 13 | 31.3 | 0.026469 | 21.53 | 349.754 | 1.614E-05 | 0.01634 | 0.3027 | 0.038557 | 2652.027 | 242.976 | 1.65752 | |
| 3 | 676 | 1562 | 0.29153 | 17.43050 | 39.1 | 24.3 | 14.8 | 31.7 | 0.026498 | 27.13 | 349.984 | 1.618E-05 | 0.02088 | 0.3871 | 0.038532 | 2645.89 | 396.4 | 1.65368 | |
| 4 | 676 | 2180 | 0.32529 | 19.44910 | 38.7 | 25.5 | 13.2 | 32.1 | 0.026527 | 37.84 | 350.213 | 1.622E-05 | 0.02914 | 0.5406 | 0.038507 | 2639.776 | 771.347 | 1.64986 | |
| 5 | 676 | 2067 | 0.35679 | 21.33245 | 43.4 | 25.9 | 17.5 | 34.65 | 0.026712 | 34.1 | 351.673 | 1.646E-05 | 0.02763 | 0.5147 | 0.038347 | 2601.339 | 689.066 | 1.62584 | |
| 6 | 676 | 2394 | 0.35613 | 21.29310 | 40.4 | 24.9 | 15.5 | 32.65 | 0.026567 | 38.58 | 350.529 | 1.627E-05 | 0.032 | 0.5942 | 0.038472 | 2631.407 | 928.94 | 1.64463 | |
| 7 | 676 | 2017 | 0.31074 | 18.57910 | 39.8 | 25.3 | 14.5 | 32.55 | 0.02656 | 31.39 | 350.471 | 1.626E-05 | 0.02696 | 0.5005 | 0.038478 | 2632.925 | 659.668 | 1.64558 | |
| 8 | 676 | 1111 | 0.17787 | 10.63470 | 34.8 | 24.9 | 9.9 | 29.85 | 0.026364 | 15.18 | 348.92 | 1.601E-05 | 0.01485 | 0.2745 | 0.03865 | 2674.473 | 201.476 | 1.67155 | |
| 9 | 676 | 1045 | 0.15934 | 9.52690 | 33.2 | 24.7 | 8.5 | 28.95 | 0.026298 | 14.22 | 348.402 | 1.593E-05 | 0.01397 | 0.2578 | 0.038707 | 2688.562 | 178.656 | 1.68035 | |
| 10 | 676 | 1112 | 0.11866 | 7.09490 | 29.1 | 24.4 | 4.7 | 26.75 | 0.026138 | 14.35 | 347.131 | 1.572E-05 | 0.01486 | 0.2733 | 0.038849 | 2723.523 | 203.438 | 1.7022 | |
| 11 | 676 | 1657 | 0.20400 | 12.19721 | 33.2 | 25.1 | 8.1 | 29.15 | 0.026313 | 24.45 | 348.517 | 1.594E-05 | 0.02215 | 0.4089 | 0.038694 | 2685.421 | 448.962 | 1.67839 | |
| 12 | 676 | 1509 | 0.23286 | 13.92270 | 36.1 | 25.8 | 10.3 | 30.95 | 0.026444 | 24.93 | 349.553 | 1.611E-05 | 0.02017 | 0.3735 | 0.03858 | 2657.417 | 370.654 | 1.66089 | |
| 13 | 676 | 2578 | 0.33616 | 20.09920 | 38.6 | 25.7 | 12.9 | 32.15 | 0.026531 | 41.34 | 350.242 | 1.622E-05 | 0.03446 | 0.6393 | 0.038504 | 2639.013 | 1078.57 | 1.64938 | |
| 14 | 676 | 1925 | 0.25878 | 15.47270 | 37.2 | 25.7 | 11.5 | 31.45 | 0.02648 | 27.54 | 349.84 | 1.616E-05 | 0.02573 | 0.4768 | 0.038548 | 2649.723 | 602.429 | 1.65608 | |
| 15 | 676 | 985 | 0.22283 | 13.32310 | 41.9 | 25.8 | 16.1 | 33.85 | 0.026654 | 14.49 | 351.216 | 1.638E-05 | 0.01317 | 0.2449 | 0.038397 | 2613.298 | 156.788 | 1.63331 | |
| 16 | 676 | 767 | 0.18213 | 10.88946 | 40.8 | 25.5 | 15.3 | 33.15 | 0.026603 | 10.2 | 350.815 | 1.632E-05 | 0.01025 | 0.1905 | 0.038441 | 2623.836 | 95.2332 | 1.6399 | |
| 17 | 676 | 1268 | 0.20938 | 12.51920 | 37.1 | 25.5 | 11.6 | 31.3 | 0.026469 | 17.88 | 349.754 | 1.614E-05 | 0.01695 | 0.314 | 0.038557 | 2652.027 | 261.485 | 1.65752 | |
| 18 | 676 | 1257 | 0.24112 | 14.41700 | 41.3 | 25.1 | 16.2 | 33.2 | 0.026607 | 16.89 | 350.844 | 1.632E-05 | 0.0168 | 0.3122 | 0.038438 | 2623.081 | 255.749 | 1.63943 | |
| 19 | 676 | 1328 | 0.27489 | 16.43560 | 43.3 | 25.5 | 17.8 | 34.4 | 0.026694 | 19.91 | 351.53 | 1.644E-05 | 0.01775 | 0.3305 | 0.038363 | 2605.066 | 284.606 | 1.62817 | |
| 20 | 676 | 1417 | 0.16747 | 10.01310 | 32.3 | 25 | 7.3 | 28.65 | 0.026276 | 18.31 | 348.229 | 1.59E-05 | 0.01894 | 0.3494 | 0.038726 | 2693.286 | 328.742 | 1.6833 | |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | |

| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |
|-------|---------|----------|-------|--------|------|
| 0.049 | 0.00024 | 0.000118 | 4E-04 | 0.0505 | 0.69 |
| 0.054 | 0.00023 | 0.000118 | 4E-04 | 0.0553 | 1.19 |
| 0.048 | 0.00023 | 0.000117 | 4E-04 | 0.0488 | 1.32 |
| 0.054 | 0.00023 | 0.000117 | 4E-04 | 0.0545 | 2.06 |
| 0.04 | 0.00023 | 0.000117 | 4E-04 | 0.0416 | 1.42 |
| 0.046 | 0.00023 | 0.000117 | 4E-04 | 0.0467 | 1.8 |
| 0.049 | 0.00023 | 0.000117 | 4E-04 | 0.0498 | 1.56 |
| 0.071 | 0.00024 | 0.000119 | 4E-04 | 0.0721 | 1.09 |
| 0.083 | 0.00025 | 0.000119 | 4E-04 | 0.0838 | 1.19 |
| 0.15 | 0.00026 | 0.000121 | 4E-04 | 0.1508 | 2.16 |
| 0.087 | 0.00024 | 0.000118 | 4E-04 | 0.0879 | 2.15 |
| 0.069 | 0.00024 | 0.000118 | 4E-04 | 0.0694 | 1.73 |
| 0.055 | 0.00023 | 0.000117 | 4E-04 | 0.0557 | 2.3 |
| 0.061 | 0.00023 | 0.000118 | 4E-04 | 0.0623 | 1.72 |
| 0.044 | 0.00024 | 0.000118 | 4E-04 | 0.045 | 0.65 |
| 0.046 | 0.00024 | 0.000119 | 4E-04 | 0.0473 | 0.48 |
| 0.061 | 0.00024 | 0.000118 | 4E-04 | 0.0618 | 1.1 |
| 0.044 | 0.00023 | 0.000118 | 4E-04 | 0.0448 | 0.76 |
| 0.04 | 0.00023 | 0.000117 | 4E-04 | 0.041 | 0.82 |
| 0.097 | 0.00025 | 0.000119 | 4E-04 | 0.0974 | 1.78 |
| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |

| UTavg/Tavg | U/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |
|------------|---------|---------|------------|--------|---------|-----------|---------|
| 0.0213303 | 0.00002 | 3.1E-05 | 0.005413 | 0.0034 | 0.00749 | 0.0290281 | 4.00939 |
| 0.0225911 | 0.00002 | 3.1E-05 | 0.0040906 | 0.0034 | 0.00749 | 0.0291159 | 7.07447 |
| 0.022306 | 0.00002 | 3.1E-05 | 0.003201 | 0.0034 | 0.00749 | 0.0284427 | 11.2747 |
| 0.022028 | 0.00002 | 3.1E-05 | 0.0022936 | 0.0034 | 0.00749 | 0.0278697 | 21.4972 |
| 0.0204069 | 0.00002 | 3E-05 | 0.002419 | 0.0034 | 0.00749 | 0.0266513 | 18.3645 |
| 0.021657 | 0.00002 | 3.1E-05 | 0.0020886 | 0.0034 | 0.00749 | 0.0275122 | 25.5571 |
| 0.0217235 | 0.00002 | 3.1E-05 | 0.0024789 | 0.0034 | 0.00749 | 0.0276936 | 18.2658 |
| 0.0236884 | 0.00002 | 3.1E-05 | 0.0045005 | 0.0034 | 0.00749 | 0.0302093 | 6.08645 |
| 0.0244249 | 0.00002 | 3.1E-05 | 0.0047847 | 0.0034 | 0.00749 | 0.0309612 | 5.53139 |
| 0.0264336 | 0.00002 | 3.2E-05 | 0.0044964 | 0.0034 | 0.00749 | 0.0324045 | 6.5923 |
| 0.0242573 | 0.00002 | 3.1E-05 | 0.0030175 | 0.0034 | 0.00749 | 0.0299213 | 13.4335 |
| 0.0228465 | 0.00002 | 3.1E-05 | 0.0033135 | 0.0034 | 0.00749 | 0.0289193 | 10.719 |
| 0.0219938 | 0.00002 | 3.1E-05 | 0.0019395 | 0.0034 | 0.00749 | 0.0277348 | 29.9139 |
| 0.0224833 | 0.00002 | 3.1E-05 | 0.0025974 | 0.0034 | 0.00749 | 0.028336 | 17.0705 |
| 0.0208892 | 0.00002 | 3.1E-05 | 0.0050761 | 0.0034 | 0.00749 | 0.0284583 | 4.46193 |
| 0.0213303 | 0.00002 | 3.1E-05 | 0.0065189 | 0.0034 | 0.00749 | 0.0299235 | 2.84971 |
| 0.0225911 | 0.00002 | 3.1E-05 | 0.0039432 | 0.0034 | 0.00749 | 0.0290344 | 7.59206 |
| 0.0212982 | 0.00002 | 3.1E-05 | 0.0039777 | 0.0034 | 0.00749 | 0.0280597 | 7.17625 |
| 0.0205552 | 0.00002 | 3E-05 | 0.0037651 | 0.0034 | 0.00749 | 0.02738 | 7.79253 |
| 0.0246806 | 0.00002 | 3.1E-05 | 0.0035286 | 0.0034 | 0.00749 | 0.0304858 | 10.022 |
| UTavg/Tavg | U/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |

| S/d | | L (m) | | | | | | | | | | | | | | | | | | |
|-----|--------|-----------|---------|----------|--------|-------|-----------|----------|----------|-------|---------|-----------|---------|---------|----------|----------|---------|---------|--|--|
| 1.5 | | 0.60000 | | | | | | | | | | | | | | | | | | |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | | |
| 1 | 723 | 834 | 0.10170 | 6.08054 | 31 | 25.8 | 5.2 | 28.4 | 0.026258 | 9.484 | 348.084 | 1.587E-05 | 0.01115 | 0.1922 | 0.041436 | 2884.763 | 106.545 | 1.80298 | | |
| 2 | 723 | 858 | 0.10598 | 6.33678 | 31.3 | 25.8 | 5.5 | 28.55 | 0.026269 | 9.734 | 348.171 | 1.589E-05 | 0.01147 | 0.1978 | 0.041426 | 2882.229 | 112.722 | 1.80139 | | |
| 3 | 723 | 875 | 0.11112 | 6.64411 | 31.3 | 25.9 | 5.4 | 28.6 | 0.026273 | 10.9 | 348.2 | 1.589E-05 | 0.0117 | 0.2017 | 0.041422 | 2881.385 | 117.218 | 1.80087 | | |
| 4 | 723 | 901 | 0.11894 | 7.11141 | 32 | 26 | 6 | 29 | 0.026302 | 11.22 | 348.431 | 1.593E-05 | 0.01204 | 0.2078 | 0.041395 | 2874.649 | 124.162 | 1.79666 | | |
| 5 | 723 | 887 | 0.13576 | 8.11739 | 33.8 | 26 | 7.8 | 29.9 | 0.026367 | 11.22 | 348.949 | 1.601E-05 | 0.01186 | 0.2049 | 0.041333 | 2859.587 | 120.059 | 1.78724 | | |
| 6 | 723 | 928 | 0.14433 | 8.62930 | 34.3 | 25.9 | 8.4 | 30.1 | 0.026382 | 11.77 | 349.064 | 1.603E-05 | 0.01241 | 0.2144 | 0.04132 | 2856.257 | 131.348 | 1.78516 | | |
| 7 | 723 | 1061 | 0.16002 | 9.56750 | 34.4 | 25.8 | 8.6 | 30.1 | 0.026382 | 14.13 | 349.064 | 1.603E-05 | 0.01418 | 0.2452 | 0.04132 | 2856.257 | 171.696 | 1.78516 | | |
| 8 | 723 | 1128 | 0.17849 | 10.67210 | 35.5 | 25.9 | 9.6 | 30.7 | 0.026426 | 15.72 | 349.409 | 1.609E-05 | 0.01508 | 0.2609 | 0.041279 | 2846.307 | 193.772 | 1.77894 | | |
| 9 | 723 | 1250 | 0.19544 | 11.68570 | 36.5 | 26 | 10.5 | 31.25 | 0.026465 | 17.21 | 349.725 | 1.614E-05 | 0.01671 | 0.2894 | 0.041242 | 2837.236 | 237.624 | 1.77327 | | |
| 10 | 723 | 1322 | 0.22115 | 13.22290 | 38.9 | 26.2 | 12.7 | 32.55 | 0.02656 | 18.16 | 350.471 | 1.626E-05 | 0.01767 | 0.3067 | 0.041154 | 2815.983 | 264.923 | 1.75999 | | |
| 11 | 723 | 1381 | 0.25469 | 15.22810 | 41.9 | 26 | 15.9 | 33.95 | 0.026661 | 19.16 | 351.273 | 1.639E-05 | 0.01846 | 0.3211 | 0.04106 | 2793.387 | 288.091 | 1.74587 | | |
| 12 | 723 | 1512 | 0.28957 | 17.31379 | 44.1 | 26.6 | 17.5 | 35.35 | 0.026763 | 22.42 | 352.073 | 1.653E-05 | 0.02021 | 0.3524 | 0.040967 | 2771.088 | 344.144 | 1.73193 | | |
| 13 | 723 | 1566 | 0.32313 | 19.32000 | 47.7 | 27 | 20.7 | 37.35 | 0.026907 | 23.47 | 353.212 | 1.671E-05 | 0.02093 | 0.3662 | 0.040834 | 2739.735 | 367.354 | 1.71233 | | |
| 14 | 723 | 2008 | 0.34015 | 20.33760 | 44.1 | 26.4 | 17.7 | 35.25 | 0.026755 | 30.59 | 352.016 | 1.652E-05 | 0.02684 | 0.4679 | 0.040973 | 2772.671 | 607.115 | 1.73292 | | |
| 15 | 723 | 2189 | 0.34015 | 20.33760 | 44.1 | 26.8 | 17.3 | 35.45 | 0.02677 | 31.28 | 352.13 | 1.653E-05 | 0.02926 | 0.5103 | 0.04096 | 2769.506 | 721.142 | 1.73094 | | |
| 16 | 723 | 1768 | 0.26251 | 15.69560 | 39.4 | 25.9 | 13.5 | 32.65 | 0.026567 | 24.06 | 350.529 | 1.627E-05 | 0.02363 | 0.4103 | 0.041147 | 2814.359 | 473.71 | 1.75897 | | |
| 17 | 723 | 1919 | 0.27994 | 16.73800 | 39.5 | 25.8 | 13.7 | 32.65 | 0.026567 | 26.96 | 350.529 | 1.627E-05 | 0.02565 | 0.4453 | 0.041147 | 2814.359 | 568.082 | 1.75897 | | |
| 18 | 723 | 1980 | 0.28868 | 17.26020 | 39.8 | 25.9 | 13.9 | 32.85 | 0.026582 | 28.24 | 350.643 | 1.629E-05 | 0.02647 | 0.4596 | 0.041134 | 2811.116 | 593.829 | 1.75695 | | |
| 19 | 723 | 1711 | 0.25447 | 15.21470 | 38.4 | 25.9 | 12.5 | 32.15 | 0.026531 | 24.45 | 350.242 | 1.622E-05 | 0.02287 | 0.3967 | 0.041181 | 2822.495 | 444.212 | 1.76406 | | |
| 20 | 723 | 2169 | 0.34101 | 20.38910 | 43.1 | 25.8 | 17.3 | 34.45 | 0.026698 | 31.52 | 351.559 | 1.644E-05 | 0.02899 | 0.5048 | 0.041026 | 2785.39 | 709.777 | 1.74087 | | |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | | |

| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |
|-------|---------|----------|-------|--------|------|
| 0.136 | 0.00027 | 0.000122 | 4E-04 | 0.1363 | 1.29 |
| 0.129 | 0.00027 | 0.000121 | 4E-04 | 0.129 | 1.26 |
| 0.131 | 0.00026 | 0.000121 | 4E-04 | 0.1313 | 1.43 |
| 0.118 | 0.00026 | 0.000121 | 4E-04 | 0.1183 | 1.33 |
| 0.091 | 0.00025 | 0.00012 | 4E-04 | 0.0912 | 1.02 |
| 0.084 | 0.00025 | 0.00012 | 4E-04 | 0.0848 | 1 |
| 0.082 | 0.00025 | 0.000119 | 4E-04 | 0.0828 | 1.17 |
| 0.074 | 0.00024 | 0.000119 | 4E-04 | 0.0743 | 1.17 |
| 0.067 | 0.00024 | 0.000118 | 4E-04 | 0.0681 | 1.17 |
| 0.056 | 0.00024 | 0.000118 | 4E-04 | 0.0566 | 1.03 |
| 0.044 | 0.00023 | 0.000118 | 4E-04 | 0.0456 | 0.87 |
| 0.04 | 0.00023 | 0.000117 | 4E-04 | 0.0416 | 0.93 |
| 0.034 | 0.00023 | 0.000117 | 4E-04 | 0.0356 | 0.84 |
| 0.04 | 0.00023 | 0.000117 | 4E-04 | 0.0412 | 1.26 |
| 0.041 | 0.00023 | 0.000117 | 4E-04 | 0.0421 | 1.32 |
| 0.052 | 0.00023 | 0.000118 | 4E-04 | 0.0533 | 1.28 |
| 0.052 | 0.00023 | 0.000117 | 4E-04 | 0.0526 | 1.42 |
| 0.051 | 0.00023 | 0.000117 | 4E-04 | 0.0518 | 1.46 |
| 0.057 | 0.00023 | 0.000118 | 4E-04 | 0.0574 | 1.4 |
| 0.041 | 0.00023 | 0.000117 | 4E-04 | 0.0421 | 1.33 |
| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |

| UTavg/Tavg | U/ff | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |
|------------|---------|---------|------------|--------|---------|-----------|---------|
| 0.0248979 | 0.00002 | 3.1E-05 | 0.0059952 | 0.0034 | 0.00749 | 0.0321578 | 3.42624 |
| 0.0247671 | 0.00002 | 3.1E-05 | 0.0058275 | 0.0034 | 0.00749 | 0.0319326 | 3.59951 |
| 0.0247238 | 0.00002 | 3.1E-05 | 0.0057143 | 0.0034 | 0.00749 | 0.031817 | 3.72954 |
| 0.0243828 | 0.00002 | 3.1E-05 | 0.0055494 | 0.0034 | 0.00749 | 0.0314348 | 3.903 |
| 0.0236488 | 0.00002 | 3.1E-05 | 0.005637 | 0.0034 | 0.00749 | 0.0309324 | 3.71372 |
| 0.0234917 | 0.00002 | 3.1E-05 | 0.0053879 | 0.0034 | 0.00749 | 0.0306337 | 4.02369 |
| 0.0234917 | 0.00002 | 3.1E-05 | 0.0047125 | 0.0034 | 0.00749 | 0.0301851 | 5.18265 |
| 0.0230326 | 0.00002 | 3.1E-05 | 0.0044326 | 0.0034 | 0.00749 | 0.029657 | 5.74668 |
| 0.0226272 | 0.00002 | 3.1E-05 | 0.004 | 0.0034 | 0.00749 | 0.0290936 | 6.91334 |
| 0.0217235 | 0.00002 | 3.1E-05 | 0.0037821 | 0.0034 | 0.00749 | 0.0282768 | 7.49116 |
| 0.0208277 | 0.00002 | 3E-05 | 0.0036206 | 0.0034 | 0.00749 | 0.0275077 | 7.92471 |
| 0.0200028 | 0.00002 | 3E-05 | 0.0033069 | 0.0034 | 0.00749 | 0.0267264 | 9.19773 |
| 0.0189317 | 0.00002 | 3E-05 | 0.0031928 | 0.0034 | 0.00749 | 0.0258773 | 9.50612 |
| 0.0200596 | 0.00002 | 3E-05 | 0.00249 | 0.0034 | 0.00749 | 0.0264128 | 16.0356 |
| 0.0199464 | 0.00002 | 3E-05 | 0.0022841 | 0.0034 | 0.00749 | 0.0262521 | 18.9315 |
| 0.021657 | 0.00002 | 3.1E-05 | 0.0028281 | 0.0034 | 0.00749 | 0.0277752 | 13.1574 |
| 0.021657 | 0.00002 | 3.1E-05 | 0.0026055 | 0.0034 | 0.00749 | 0.027688 | 15.4522 |
| 0.0215251 | 0.00002 | 3.1E-05 | 0.0025253 | 0.0034 | 0.00749 | 0.0275551 | 16.363 |
| 0.0219938 | 0.00002 | 3.1E-05 | 0.0029223 | 0.0034 | 0.00749 | 0.0280772 | 12.4723 |
| 0.0205254 | 0.00002 | 3E-05 | 0.0023052 | 0.0034 | 0.00749 | 0.026702 | 18.9524 |
| UTavg/Tavg | U/ff | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |

| S/d | | L (m) | | | | | | | | | | | | | | | | | | |
|-----|--------|-----------|---------|----------|--------|-------|-----------|----------|----------|-------|---------|-----------|---------|---------|----------|----------|---------|---------|--|--|
| 1.5 | | 0.65000 | | | | | | | | | | | | | | | | | | |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | | |
| 1 | 925 | 712 | 0.10149 | 6.06794 | 30.4 | 24.7 | 5.7 | 27.55 | 0.026196 | 8.637 | 347.594 | 1.58E-05 | 0.00952 | 0.1281 | 0.053088 | 3709.201 | 60.8272 | 2.31825 | | |
| 2 | 925 | 1086 | 0.13569 | 8.11307 | 32.1 | 24.8 | 7.3 | 28.45 | 0.026262 | 12.03 | 348.113 | 1.588E-05 | 0.01452 | 0.1956 | 0.053008 | 3689.659 | 141.189 | 2.30604 | | |
| 3 | 925 | 1174 | 0.16987 | 10.15653 | 35.4 | 24.9 | 10.5 | 30.15 | 0.026386 | 13.04 | 349.093 | 1.604E-05 | 0.01569 | 0.2121 | 0.05286 | 3653.207 | 164.288 | 2.28325 | | |
| 4 | 925 | 1267 | 0.20379 | 12.18483 | 38.7 | 25 | 13.7 | 31.85 | 0.026509 | 14.32 | 350.07 | 1.62E-05 | 0.01694 | 0.2295 | 0.052712 | 3617.344 | 190.532 | 2.26084 | | |
| 5 | 925 | 1350 | 0.23757 | 14.20445 | 41.5 | 25.9 | 15.6 | 33.7 | 0.026643 | 17 | 351.13 | 1.637E-05 | 0.01805 | 0.2453 | 0.052553 | 3578.97 | 215.316 | 2.23686 | | |
| 6 | 925 | 1432 | 0.27162 | 16.24059 | 45.1 | 26.2 | 18.9 | 35.65 | 0.026784 | 18.25 | 352.244 | 1.655E-05 | 0.01914 | 0.261 | 0.052387 | 3539.241 | 241.1 | 2.21203 | | |
| 7 | 925 | 1839 | 0.30556 | 18.26950 | 44.9 | 25.6 | 19.3 | 35.25 | 0.026755 | 22.64 | 352.016 | 1.652E-05 | 0.02458 | 0.335 | 0.052421 | 3547.332 | 398.019 | 2.21708 | | |
| 8 | 925 | 2141 | 0.33954 | 20.30150 | 45.7 | 26.5 | 19.2 | 36.1 | 0.026817 | 28.04 | 352.501 | 1.66E-05 | 0.02862 | 0.3905 | 0.052349 | 3530.176 | 538.348 | 2.20636 | | |
| 9 | 925 | 1519 | 0.16965 | 10.14340 | 34.9 | 25.9 | 9 | 30.4 | 0.026404 | 15.16 | 349.237 | 1.606E-05 | 0.02031 | 0.2745 | 0.052838 | 3647.897 | 274.86 | 2.27994 | | |
| 10 | 925 | 1740 | 0.13569 | 8.11310 | 31.5 | 26 | 5.5 | 28.75 | 0.026284 | 15.95 | 348.286 | 1.591E-05 | 0.02326 | 0.3136 | 0.052982 | 3683.183 | 362.167 | 2.30199 | | |
| 11 | 925 | 1376 | 0.12048 | 7.20377 | 31.3 | 25.6 | 5.7 | 28.45 | 0.026262 | 12.14 | 348.113 | 1.588E-05 | 0.01839 | 0.2479 | 0.053008 | 3689.659 | 226.662 | 2.30604 | | |
| 12 | 925 | 1382 | 0.15267 | 9.12834 | 33.3 | 26.2 | 7.1 | 29.75 | 0.026356 | 15.6 | 348.863 | 1.6E-05 | 0.01847 | 0.2495 | 0.052895 | 3661.731 | 227.89 | 2.28658 | | |
| 13 | 925 | 1315 | 0.18689 | 11.17450 | 36.4 | 25.5 | 10.9 | 30.95 | 0.026444 | 15.17 | 349.553 | 1.611E-05 | 0.01758 | 0.2378 | 0.05279 | 3636.258 | 205.706 | 2.27266 | | |
| 14 | 925 | 1654 | 0.22108 | 13.21880 | 38.1 | 25.8 | 12.3 | 31.95 | 0.026516 | 18.76 | 350.127 | 1.621E-05 | 0.02211 | 0.2997 | 0.052703 | 3615.253 | 324.62 | 2.25953 | | |
| 15 | 925 | 1918 | 0.25552 | 15.27770 | 40.2 | 26 | 14.2 | 33.1 | 0.0266 | 21.64 | 350.787 | 1.631E-05 | 0.02564 | 0.3481 | 0.052604 | 3591.342 | 435.265 | 2.24459 | | |
| 16 | 925 | 2087 | 0.28868 | 17.26020 | 41.6 | 25.9 | 15.7 | 33.75 | 0.026647 | 24.94 | 351.159 | 1.637E-05 | 0.0279 | 0.3792 | 0.052549 | 3577.942 | 514.516 | 2.23621 | | |
| 17 | 925 | 1257 | 0.11098 | 6.63576 | 30.8 | 25.7 | 5.1 | 28.25 | 0.026247 | 11.52 | 347.998 | 1.586E-05 | 0.0168 | 0.2263 | 0.053026 | 3693.987 | 189.249 | 2.30874 | | |
| 18 | 925 | 1965 | 0.26408 | 15.78960 | 40.1 | 26.2 | 13.9 | 33.15 | 0.026603 | 23.61 | 350.815 | 1.632E-05 | 0.02627 | 0.3567 | 0.0526 | 3590.308 | 456.802 | 2.24394 | | |
| 19 | 925 | 1826 | 0.22985 | 13.74310 | 38 | 25.9 | 12.1 | 31.95 | 0.026516 | 20.62 | 350.127 | 1.621E-05 | 0.02441 | 0.3308 | 0.052703 | 3615.253 | 395.646 | 2.25953 | | |
| 20 | 925 | 2021 | 0.28018 | 16.75240 | 41.1 | 26.1 | 15 | 33.6 | 0.026636 | 24.6 | 351.073 | 1.636E-05 | 0.02702 | 0.3671 | 0.052562 | 3581.027 | 482.668 | 2.23814 | | |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | | |

| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |
|-------|---------|----------|-------|--------|------|
| 0.124 | 0.00027 | 0.000122 | 4E-04 | 0.1245 | 1.07 |
| 0.097 | 0.00025 | 0.00012 | 4E-04 | 0.0974 | 1.17 |
| 0.067 | 0.00025 | 0.000119 | 4E-04 | 0.0681 | 0.89 |
| 0.052 | 0.00024 | 0.000118 | 4E-04 | 0.0526 | 0.75 |
| 0.045 | 0.00024 | 0.000118 | 4E-04 | 0.0464 | 0.79 |
| 0.037 | 0.00023 | 0.000117 | 4E-04 | 0.0387 | 0.71 |
| 0.037 | 0.00023 | 0.000117 | 4E-04 | 0.038 | 0.86 |
| 0.037 | 0.00023 | 0.000117 | 4E-04 | 0.0382 | 1.07 |
| 0.079 | 0.00025 | 0.000119 | 4E-04 | 0.0792 | 1.2 |
| 0.129 | 0.00025 | 0.00012 | 4E-04 | 0.129 | 2.06 |
| 0.124 | 0.00026 | 0.000121 | 4E-04 | 0.1245 | 1.51 |
| 0.1 | 0.00025 | 0.000119 | 4E-04 | 0.1001 | 1.56 |
| 0.065 | 0.00024 | 0.000119 | 4E-04 | 0.0656 | 1 |
| 0.057 | 0.00024 | 0.000118 | 4E-04 | 0.0584 | 1.09 |
| 0.05 | 0.00023 | 0.000118 | 4E-04 | 0.0508 | 1.1 |
| 0.045 | 0.00023 | 0.000117 | 4E-04 | 0.0461 | 1.15 |
| 0.139 | 0.00026 | 0.000121 | 4E-04 | 0.139 | 1.6 |
| 0.051 | 0.00023 | 0.000118 | 4E-04 | 0.0518 | 1.22 |
| 0.058 | 0.00024 | 0.000118 | 4E-04 | 0.0593 | 1.22 |
| 0.047 | 0.00023 | 0.000117 | 4E-04 | 0.0482 | 1.19 |
| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |

| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |
|------------|---------|---------|------------|--------|---------|-----------|---------|
| 0.0256661 | 0.00002 | 3.2E-05 | 0.0070225 | 0.0034 | 0.00749 | 0.0335627 | 2.04152 |
| 0.0248541 | 0.00002 | 3.1E-05 | 0.0046041 | 0.0034 | 0.00749 | 0.0311924 | 4.40402 |
| 0.0234527 | 0.00002 | 3.1E-05 | 0.0042589 | 0.0034 | 0.00749 | 0.0298836 | 4.90953 |
| 0.0222009 | 0.00002 | 3.1E-05 | 0.0039463 | 0.0034 | 0.00749 | 0.0287336 | 5.47466 |
| 0.0209822 | 0.00002 | 3.1E-05 | 0.0037037 | 0.0034 | 0.00749 | 0.0276689 | 5.95755 |
| 0.0198345 | 0.00002 | 3E-05 | 0.0034916 | 0.0034 | 0.00749 | 0.0266949 | 6.43615 |
| 0.0200596 | 0.00002 | 3E-05 | 0.0027189 | 0.0034 | 0.00749 | 0.0265029 | 10.5486 |
| 0.0195873 | 0.00002 | 3E-05 | 0.0023354 | 0.0034 | 0.00749 | 0.0259985 | 13.9963 |
| 0.0232599 | 0.00002 | 3.1E-05 | 0.0032916 | 0.0034 | 0.00749 | 0.0292371 | 8.03612 |
| 0.0245948 | 0.00002 | 3.1E-05 | 0.0028736 | 0.0034 | 0.00749 | 0.0301393 | 10.9155 |
| 0.0248541 | 0.00002 | 3.1E-05 | 0.0036337 | 0.0034 | 0.00749 | 0.0306756 | 6.95298 |
| 0.0237681 | 0.00002 | 3.1E-05 | 0.0036179 | 0.0034 | 0.00749 | 0.0297947 | 6.78992 |
| 0.0228465 | 0.00002 | 3.1E-05 | 0.0038023 | 0.0034 | 0.00749 | 0.0291589 | 5.99815 |
| 0.0221315 | 0.00002 | 3.1E-05 | 0.003023 | 0.0034 | 0.00749 | 0.0282277 | 9.16327 |
| 0.0213625 | 0.00002 | 3.1E-05 | 0.0026069 | 0.0034 | 0.00749 | 0.0274588 | 11.9519 |
| 0.0209511 | 0.00002 | 3.1E-05 | 0.0023958 | 0.0034 | 0.00749 | 0.027062 | 13.9239 |
| 0.0250301 | 0.00002 | 3.2E-05 | 0.0039777 | 0.0034 | 0.00749 | 0.0309878 | 5.86439 |
| 0.0213303 | 0.00002 | 3.1E-05 | 0.0025445 | 0.0034 | 0.00749 | 0.0274103 | 12.5211 |
| 0.0221315 | 0.00002 | 3.1E-05 | 0.0027382 | 0.0034 | 0.00749 | 0.0281112 | 11.1221 |
| 0.0210446 | 0.00002 | 3.1E-05 | 0.002474 | 0.0034 | 0.00749 | 0.0271626 | 13.1105 |
| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |

| S/d | | 1.5 | L (m) | | 0.65000 | | | | | | | | | | | | | |
|-----|--------|-----------|---------|---------|---------|-------|-----------|----------|----------|-------|---------|-----------|---------|---------|----------|----------|---------|---------|
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi |
| 1 | 1202 | 1490 | 0.10163 | 6.07670 | 26.6 | 23.3 | 3.3 | 24.95 | 0.026006 | 15.07 | 346.088 | 1.555E-05 | 0.01992 | 0.2053 | 0.069285 | 4894.574 | 206.371 | 3.05911 |
| 2 | 1202 | 1531 | 0.11950 | 7.14515 | 27.8 | 23.5 | 4.3 | 25.65 | 0.026057 | 15.96 | 346.494 | 1.562E-05 | 0.02047 | 0.2112 | 0.069204 | 4874.298 | 217.491 | 3.04644 |
| 3 | 1202 | 1570 | 0.13582 | 8.12080 | 28.9 | 23.4 | 5.5 | 26.15 | 0.026094 | 16.09 | 346.783 | 1.567E-05 | 0.02099 | 0.2168 | 0.069146 | 4859.9 | 228.419 | 3.03744 |
| 4 | 1202 | 1329 | 0.10946 | 6.54463 | 28.1 | 23.5 | 4.6 | 25.8 | 0.026068 | 12.51 | 346.581 | 1.563E-05 | 0.01777 | 0.1834 | 0.069187 | 4869.971 | 163.822 | 3.04373 |
| 5 | 1202 | 1235 | 0.10231 | 6.11747 | 28.1 | 23.7 | 4.4 | 25.9 | 0.026076 | 11.42 | 346.639 | 1.564E-05 | 0.01651 | 0.1705 | 0.069175 | 4867.09 | 141.431 | 3.04193 |
| 6 | 1202 | 790 | 0.08601 | 5.14235 | 28 | 23.8 | 4.2 | 25.9 | 0.026076 | 8.457 | 346.639 | 1.564E-05 | 0.01056 | 0.109 | 0.069175 | 4867.09 | 67.8716 | 3.04193 |
| 7 | 1202 | 1027 | 0.09393 | 5.61624 | 27.9 | 23.7 | 4.2 | 25.8 | 0.026068 | 10.09 | 346.581 | 1.563E-05 | 0.01373 | 0.1417 | 0.069187 | 4869.971 | 97.8283 | 3.04373 |
| 8 | 1202 | 1096 | 0.10365 | 6.19757 | 28.8 | 23.7 | 5.1 | 26.25 | 0.026101 | 10.11 | 346.841 | 1.567E-05 | 0.01465 | 0.1514 | 0.069135 | 4857.029 | 111.286 | 3.03564 |
| 9 | 1202 | 1230 | 0.11237 | 6.71873 | 29 | 23.8 | 5.2 | 26.4 | 0.026112 | 11.64 | 346.928 | 1.569E-05 | 0.01644 | 0.1699 | 0.069118 | 4852.727 | 140.108 | 3.03295 |
| 10 | 1202 | 1310 | 0.12001 | 7.17570 | 29.2 | 23.7 | 5.5 | 26.45 | 0.026116 | 12.56 | 346.957 | 1.569E-05 | 0.01751 | 0.181 | 0.069112 | 4851.295 | 168.906 | 3.03206 |
| 11 | 1202 | 1392 | 0.12845 | 7.68009 | 29.5 | 23.9 | 5.6 | 26.7 | 0.026134 | 14.12 | 347.102 | 1.572E-05 | 0.01861 | 0.1924 | 0.069083 | 4844.143 | 179.307 | 3.02759 |
| 12 | 1202 | 1429 | 0.13739 | 8.21492 | 30.2 | 24 | 6.2 | 27.1 | 0.026163 | 14.57 | 347.333 | 1.575E-05 | 0.0191 | 0.1976 | 0.069037 | 4832.736 | 188.773 | 3.02046 |
| 13 | 1202 | 1658 | 0.14726 | 8.80450 | 29.7 | 23.9 | 5.8 | 26.8 | 0.026141 | 17.91 | 347.16 | 1.573E-05 | 0.02216 | 0.2292 | 0.069071 | 4841.287 | 254.318 | 3.0258 |
| 14 | 1202 | 1443 | 0.13673 | 8.17529 | 30.2 | 24.1 | 6.1 | 27.15 | 0.026167 | 14.87 | 347.362 | 1.578E-05 | 0.01929 | 0.1996 | 0.069031 | 4831.313 | 192.465 | 3.01957 |
| 15 | 1202 | 1286 | 0.12688 | 7.58623 | 30.2 | 23.9 | 6.3 | 27.05 | 0.02616 | 12.23 | 347.304 | 1.575E-05 | 0.01719 | 0.1778 | 0.069043 | 4834.16 | 152.902 | 3.02135 |
| 16 | 1202 | 1637 | 0.12152 | 7.26600 | 28.3 | 24 | 4.3 | 26.15 | 0.026094 | 16.48 | 346.783 | 1.567E-05 | 0.02188 | 0.226 | 0.069146 | 4859.9 | 248.33 | 3.03744 |
| 17 | 1202 | 1398 | 0.11482 | 6.86506 | 28.7 | 24 | 4.7 | 26.35 | 0.026108 | 13.45 | 346.899 | 1.568E-05 | 0.01869 | 0.1931 | 0.069123 | 4854.161 | 181.019 | 3.03385 |
| 18 | 1202 | 1440 | 0.11929 | 7.13235 | 29 | 24.3 | 4.7 | 26.65 | 0.02613 | 14.51 | 347.073 | 1.571E-05 | 0.01925 | 0.199 | 0.069089 | 4845.572 | 191.911 | 3.02848 |
| 19 | 1202 | 1580 | 0.12666 | 7.57281 | 28.9 | 24.3 | 4.6 | 26.6 | 0.026127 | 16.71 | 347.044 | 1.571E-05 | 0.02112 | 0.2183 | 0.069094 | 4847.002 | 231.071 | 3.02938 |
| 20 | 1202 | 1190 | 0.10990 | 6.57095 | 29.3 | 24.1 | 5.2 | 26.7 | 0.026134 | 11.13 | 347.102 | 1.572E-05 | 0.01591 | 0.1645 | 0.069083 | 4844.143 | 131.043 | 3.02759 |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi |

| UdT/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |
|-------|---------|----------|-------|--------|------|
| 0.214 | 0.00027 | 0.000122 | 4E-04 | 0.2145 | 3.23 |
| 0.164 | 0.00026 | 0.000121 | 4E-04 | 0.1647 | 2.63 |
| 0.129 | 0.00025 | 0.00012 | 4E-04 | 0.129 | 2.08 |
| 0.154 | 0.00026 | 0.000121 | 4E-04 | 0.154 | 1.93 |
| 0.161 | 0.00027 | 0.000122 | 4E-04 | 0.161 | 1.84 |
| 0.168 | 0.00028 | 0.000123 | 4E-04 | 0.1687 | 1.43 |
| 0.168 | 0.00027 | 0.000122 | 4E-04 | 0.1687 | 1.7 |
| 0.139 | 0.00027 | 0.000121 | 4E-04 | 0.139 | 1.4 |
| 0.136 | 0.00026 | 0.000121 | 4E-04 | 0.1363 | 1.59 |
| 0.129 | 0.00026 | 0.000121 | 4E-04 | 0.129 | 1.62 |
| 0.126 | 0.00026 | 0.00012 | 4E-04 | 0.1267 | 1.79 |
| 0.114 | 0.00025 | 0.00012 | 4E-04 | 0.1145 | 1.67 |
| 0.122 | 0.00025 | 0.00012 | 4E-04 | 0.1223 | 2.19 |
| 0.116 | 0.00025 | 0.00012 | 4E-04 | 0.1164 | 1.71 |
| 0.112 | 0.00026 | 0.00012 | 4E-04 | 0.1127 | 1.38 |
| 0.164 | 0.00026 | 0.000121 | 4E-04 | 0.1647 | 2.72 |
| 0.15 | 0.00026 | 0.000121 | 4E-04 | 0.1508 | 2.03 |
| 0.15 | 0.00026 | 0.000121 | 4E-04 | 0.1508 | 2.19 |
| 0.154 | 0.00026 | 0.00012 | 4E-04 | 0.154 | 2.57 |
| 0.136 | 0.00026 | 0.000121 | 4E-04 | 0.1363 | 1.52 |
| UdT/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |

| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |
|------------|---------|---------|------------|--------|---------|-----------|---------|
| 0.0283407 | 0.00002 | 3.2E-05 | 0.0033557 | 0.0034 | 0.00749 | 0.0334467 | 6.90242 |
| 0.0275673 | 0.00002 | 3.2E-05 | 0.0032658 | 0.0034 | 0.00749 | 0.0327576 | 7.12449 |
| 0.0270402 | 0.00002 | 3.2E-05 | 0.0031847 | 0.0034 | 0.00749 | 0.0322829 | 7.37402 |
| 0.027407 | 0.00002 | 3.2E-05 | 0.0037622 | 0.0034 | 0.00749 | 0.032836 | 5.37928 |
| 0.0273012 | 0.00002 | 3.2E-05 | 0.0040486 | 0.0034 | 0.00749 | 0.0328841 | 4.65084 |
| 0.0273012 | 0.00002 | 3.2E-05 | 0.0063291 | 0.0034 | 0.00749 | 0.0342933 | 1.98461 |
| 0.027407 | 0.00002 | 3.2E-05 | 0.0048685 | 0.0034 | 0.00749 | 0.0334126 | 3.26869 |
| 0.0269371 | 0.00002 | 3.2E-05 | 0.004562 | 0.0034 | 0.00749 | 0.0328528 | 3.65607 |
| 0.0267841 | 0.00002 | 3.2E-05 | 0.004065 | 0.0034 | 0.00749 | 0.0324643 | 4.54852 |
| 0.0267335 | 0.00002 | 3.2E-05 | 0.0038168 | 0.0034 | 0.00749 | 0.0323016 | 5.13293 |
| 0.0264831 | 0.00002 | 3.2E-05 | 0.003592 | 0.0034 | 0.00749 | 0.0319908 | 5.73618 |
| 0.0260923 | 0.00002 | 3.2E-05 | 0.003499 | 0.0034 | 0.00749 | 0.0316263 | 5.97018 |
| 0.0263843 | 0.00002 | 3.2E-05 | 0.0030157 | 0.0034 | 0.00749 | 0.0316695 | 8.05412 |
| 0.0260442 | 0.00002 | 3.2E-05 | 0.003465 | 0.0034 | 0.00749 | 0.0315717 | 6.07644 |
| 0.0261405 | 0.00002 | 3.2E-05 | 0.003888 | 0.0034 | 0.00749 | 0.0318471 | 4.86947 |
| 0.0270402 | 0.00002 | 3.2E-05 | 0.0030544 | 0.0034 | 0.00749 | 0.0322325 | 8.0043 |
| 0.0268349 | 0.00002 | 3.2E-05 | 0.0035765 | 0.0034 | 0.00749 | 0.0322758 | 5.84252 |
| 0.0265328 | 0.00002 | 3.2E-05 | 0.0034722 | 0.0034 | 0.00749 | 0.0319791 | 6.13714 |
| 0.0265827 | 0.00002 | 3.2E-05 | 0.0031646 | 0.0034 | 0.00749 | 0.0318927 | 7.36947 |
| 0.0264831 | 0.00002 | 3.2E-05 | 0.0042017 | 0.0034 | 0.00749 | 0.0322865 | 4.23092 |
| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |

| S/d | | 1.5 | L (m) | | 0.65000 | | | | | | | | | | | | | |
|-----|--------|-----------|---------|---------|---------|-------|-----------|----------|----------|-------|---------|-----------|---------|---------|----------|----------|---------|---------|
| # | f (Hz) | Vmfc (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi |
| 1 | 1461 | 905 | 0.05172 | 3.09214 | 26.4 | 25.1 | 1.3 | 25.75 | 0.026065 | 9.883 | 346.552 | 1.563E-05 | 0.0121 | 0.1027 | 0.084102 | 5921.077 | 62.5073 | 3.70067 |
| 2 | 1461 | 736 | 0.04247 | 2.53922 | 26.2 | 25.1 | 1.1 | 25.65 | 0.026057 | 7.879 | 346.494 | 1.562E-05 | 0.00984 | 0.0835 | 0.084116 | 5924.584 | 41.3524 | 3.70287 |
| 3 | 1461 | 1087 | 0.05965 | 3.56659 | 27 | 25.3 | 1.7 | 26.15 | 0.026094 | 10.04 | 346.783 | 1.567E-05 | 0.01453 | 0.1235 | 0.084046 | 5907.083 | 90.0836 | 3.69193 |
| 4 | 1461 | 734 | 0.04202 | 2.51270 | 26.2 | 25.2 | 1 | 25.7 | 0.026061 | 8.485 | 346.523 | 1.562E-05 | 0.00981 | 0.0833 | 0.084109 | 5922.83 | 41.1227 | 3.70177 |
| 5 | 1461 | 1137 | 0.06813 | 4.07351 | 27.4 | 25.2 | 2.2 | 26.3 | 0.026105 | 10.12 | 346.87 | 1.568E-05 | 0.0152 | 0.1292 | 0.084025 | 5901.85 | 98.5236 | 3.68866 |
| 6 | 1461 | 540 | 0.03443 | 2.05863 | 26.6 | 25.2 | 1.4 | 25.9 | 0.026076 | 4.066 | 346.639 | 1.564E-05 | 0.00722 | 0.0613 | 0.084081 | 5915.823 | 22.2461 | 3.69739 |
| 7 | 1461 | 868 | 0.04226 | 2.52654 | 26.6 | 25.6 | 1 | 26.1 | 0.02609 | 8.569 | 346.754 | 1.566E-05 | 0.0116 | 0.0986 | 0.084053 | 5908.83 | 57.4489 | 3.69302 |
| 8 | 1461 | 1065 | 0.05294 | 3.16550 | 26.9 | 25.6 | 1.3 | 26.25 | 0.026101 | 10.34 | 346.841 | 1.567E-05 | 0.01424 | 0.121 | 0.084032 | 5903.593 | 86.4519 | 3.68975 |
| 9 | 1461 | 998 | 0.05941 | 3.55224 | 27 | 25.4 | 1.6 | 26.2 | 0.026098 | 10.58 | 346.812 | 1.567E-05 | 0.01334 | 0.1134 | 0.084039 | 5905.338 | 75.9263 | 3.69084 |
| 10 | 1461 | 1114 | 0.06901 | 4.12636 | 27.4 | 25.4 | 2 | 26.4 | 0.026112 | 11.42 | 346.928 | 1.569E-05 | 0.01489 | 0.1266 | 0.084011 | 5898.365 | 94.5536 | 3.68648 |
| 11 | 1461 | 562 | 0.03397 | 2.03087 | 26.6 | 25.8 | 0.8 | 26.2 | 0.026098 | 6.919 | 346.812 | 1.567E-05 | 0.00751 | 0.0639 | 0.084039 | 5905.338 | 24.0771 | 3.69084 |
| 12 | 1461 | 640 | 0.03844 | 2.29816 | 26.4 | 25.4 | 1 | 25.9 | 0.026076 | 7.094 | 346.639 | 1.564E-05 | 0.00856 | 0.0727 | 0.084081 | 5915.823 | 31.2483 | 3.69739 |
| 13 | 1461 | 1063 | 0.05093 | 3.04512 | 26.8 | 25.7 | 1.1 | 26.25 | 0.026101 | 11.31 | 346.841 | 1.567E-05 | 0.01421 | 0.1208 | 0.084032 | 5903.593 | 86.1275 | 3.68975 |
| 14 | 1461 | 922 | 0.05896 | 3.52552 | 27.1 | 25.6 | 1.5 | 26.35 | 0.026108 | 11.12 | 346.899 | 1.568E-05 | 0.01232 | 0.1048 | 0.084018 | 5900.107 | 64.7777 | 3.68757 |
| 15 | 1461 | 1163 | 0.06878 | 4.11251 | 28 | 26 | 2 | 27 | 0.026156 | 11.32 | 347.275 | 1.574E-05 | 0.01555 | 0.1323 | 0.083927 | 5877.527 | 102.896 | 3.67345 |
| 16 | 1461 | 611 | 0.03374 | 2.01735 | 26.5 | 25.4 | 1.1 | 25.95 | 0.026079 | 4.969 | 346.668 | 1.565E-05 | 0.00817 | 0.0694 | 0.084074 | 5914.073 | 28.4769 | 3.6963 |
| 17 | 1461 | 708 | 0.04356 | 2.60476 | 26.6 | 25.6 | 1 | 26.1 | 0.02609 | 9.108 | 346.754 | 1.566E-05 | 0.00946 | 0.0804 | 0.084053 | 5908.83 | 38.2216 | 3.69302 |
| 18 | 1461 | 1088 | 0.05361 | 3.20528 | 26.7 | 25.5 | 1.2 | 26.1 | 0.02609 | 11.49 | 346.754 | 1.566E-05 | 0.01454 | 0.1236 | 0.084053 | 5908.83 | 90.261 | 3.69302 |
| 19 | 1461 | 1104 | 0.07013 | 4.19291 | 27.9 | 25.6 | 2.3 | 26.75 | 0.026138 | 10.24 | 347.131 | 1.572E-05 | 0.01476 | 0.1255 | 0.083962 | 5886.195 | 92.7804 | 3.67887 |
| 20 | 1461 | 1002 | 0.05941 | 3.55214 | 26.9 | 25.4 | 1.5 | 26.15 | 0.026094 | 11.29 | 346.783 | 1.567E-05 | 0.01339 | 0.1138 | 0.084046 | 5907.083 | 76.5459 | 3.69193 |
| # | f (Hz) | Vmfc (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi |

| Ud/T/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |
|--------|---------|----------|-------|--------|------|
| 0.544 | 0.00033 | 0.000128 | 4E-04 | 0.544 | 5.38 |
| 0.643 | 0.00035 | 0.000131 | 4E-04 | 0.6429 | 5.07 |
| 0.416 | 0.00031 | 0.000126 | 4E-04 | 0.4161 | 4.18 |
| 0.707 | 0.00035 | 0.000131 | 4E-04 | 0.7072 | 6 |
| 0.321 | 0.0003 | 0.000125 | 4E-04 | 0.3216 | 3.25 |
| 0.505 | 0.00038 | 0.000134 | 4E-04 | 0.5052 | 2.05 |
| 0.707 | 0.00035 | 0.000131 | 4E-04 | 0.7072 | 6.06 |
| 0.544 | 0.00032 | 0.000128 | 4E-04 | 0.544 | 5.63 |
| 0.442 | 0.00031 | 0.000126 | 4E-04 | 0.4421 | 4.68 |
| 0.354 | 0.0003 | 0.000125 | 4E-04 | 0.3537 | 4.04 |
| 0.884 | 0.00039 | 0.000135 | 4E-04 | 0.8839 | 6.12 |
| 0.707 | 0.00037 | 0.000132 | 4E-04 | 0.7072 | 5.02 |
| 0.643 | 0.00033 | 0.000128 | 4E-04 | 0.6429 | 7.27 |
| 0.471 | 0.00031 | 0.000126 | 4E-04 | 0.4715 | 5.24 |
| 0.354 | 0.0003 | 0.000125 | 4E-04 | 0.3537 | 4.01 |
| 0.643 | 0.00039 | 0.000135 | 4E-04 | 0.6429 | 3.19 |
| 0.707 | 0.00035 | 0.00013 | 4E-04 | 0.7072 | 6.44 |
| 0.589 | 0.00032 | 0.000127 | 4E-04 | 0.5893 | 6.77 |
| 0.307 | 0.0003 | 0.000125 | 4E-04 | 0.3076 | 3.15 |
| 0.471 | 0.00031 | 0.000126 | 4E-04 | 0.4715 | 5.32 |
| Ud/T/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |

| UTavg/Tavg | Ufff | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |
|------------|---------|---------|------------|--------|---------|-----------|---------|
| 0.0274602 | 0.00002 | 3.2E-05 | 0.0055249 | 0.0034 | 0.00749 | 0.0338616 | 2.11659 |
| 0.0275673 | 0.00002 | 3.2E-05 | 0.0067935 | 0.0034 | 0.00749 | 0.0348569 | 1.44142 |
| 0.0270402 | 0.00002 | 3.2E-05 | 0.0045998 | 0.0034 | 0.00749 | 0.0329583 | 2.969 |
| 0.0275136 | 0.00002 | 3.2E-05 | 0.006812 | 0.0034 | 0.00749 | 0.034829 | 1.43226 |
| 0.0268859 | 0.00002 | 3.2E-05 | 0.0043975 | 0.0034 | 0.00749 | 0.0327208 | 3.22377 |
| 0.0273012 | 0.00002 | 3.2E-05 | 0.0092593 | 0.0034 | 0.00749 | 0.036861 | 0.82001 |
| 0.027092 | 0.00002 | 3.2E-05 | 0.0057604 | 0.0034 | 0.00749 | 0.0337216 | 1.93727 |
| 0.0269371 | 0.00002 | 3.2E-05 | 0.0046948 | 0.0034 | 0.00749 | 0.0329275 | 2.84665 |
| 0.0269885 | 0.00002 | 3.2E-05 | 0.00501 | 0.0034 | 0.00749 | 0.0331546 | 2.51731 |
| 0.0267841 | 0.00002 | 3.2E-05 | 0.0044883 | 0.0034 | 0.00749 | 0.0326866 | 3.09064 |
| 0.0269885 | 0.00002 | 3.2E-05 | 0.0088968 | 0.0034 | 0.00749 | 0.036269 | 0.87325 |
| 0.0273012 | 0.00002 | 3.2E-05 | 0.0078125 | 0.0034 | 0.00749 | 0.0354956 | 1.10918 |
| 0.0269371 | 0.00002 | 3.2E-05 | 0.0047037 | 0.0034 | 0.00749 | 0.0329326 | 2.8364 |
| 0.0268349 | 0.00002 | 3.2E-05 | 0.005423 | 0.0034 | 0.00749 | 0.0332896 | 2.15642 |
| 0.0261889 | 0.00002 | 3.2E-05 | 0.0042992 | 0.0034 | 0.00749 | 0.0320973 | 3.30269 |
| 0.0272486 | 0.00002 | 3.2E-05 | 0.0081833 | 0.0034 | 0.00749 | 0.0357882 | 1.01914 |
| 0.027092 | 0.00002 | 3.2E-05 | 0.0070621 | 0.0034 | 0.00749 | 0.0346975 | 1.32619 |
| 0.027092 | 0.00002 | 3.2E-05 | 0.0045956 | 0.0034 | 0.00749 | 0.0329985 | 2.97847 |
| 0.0264336 | 0.00002 | 3.2E-05 | 0.004529 | 0.0034 | 0.00749 | 0.0324227 | 3.00819 |
| 0.0270402 | 0.00002 | 3.2E-05 | 0.00499 | 0.0034 | 0.00749 | 0.0331846 | 2.54015 |
| UTavg/Tavg | Ufff | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |

| Svd | | 1.75 | L (m) | | 0.24000 | | | | | | | | | | | | | | | | |
|-----|--------|-----------|---------|----------|---------|-------|-----------|----------|----------|-------|---------|-----------|---------|---------|---------|---------|-------|----------|--|--|--|
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | dellaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | | | |
| 1 | 383 | 501 | 0.13851 | 8.26906 | 36.7 | 24.6 | 12.1 | 30.65 | 0.026422 | 7.502 | 349.381 | 1.61E-05 | 0.0067 | 0.21874 | 0.02187 | 1508.23 | 72.17 | 2.120952 | | | |
| 2 | 383 | 600 | 0.14713 | 8.78367 | 35.9 | 24.7 | 11.2 | 30.3 | 0.026396 | 9.154 | 349.179 | 1.61E-05 | 0.00802 | 0.26182 | 0.02188 | 1511.31 | 103.6 | 2.125273 | | | |
| 3 | 383 | 699 | 0.15577 | 9.29953 | 35 | 24.6 | 10.4 | 29.8 | 0.02636 | 11.07 | 348.892 | 1.6E-05 | 0.00934 | 0.30477 | 0.0219 | 1515.71 | 140.8 | 2.131471 | | | |
| 4 | 383 | 801 | 0.16419 | 9.80238 | 34.1 | 24.5 | 9.6 | 29.3 | 0.026324 | 13.34 | 348.604 | 1.6E-05 | 0.01071 | 0.34895 | 0.02192 | 1520.14 | 185.1 | 2.137698 | | | |
| 5 | 383 | 900 | 0.17283 | 10.31814 | 34 | 24.4 | 9.6 | 29.2 | 0.026316 | 14.78 | 348.546 | 1.59E-05 | 0.01203 | 0.39201 | 0.02192 | 1521.03 | 233.7 | 2.138948 | | | |
| 6 | 383 | 1000 | 0.18170 | 10.84775 | 34.2 | 24.2 | 10 | 29.2 | 0.026316 | 15.68 | 348.546 | 1.59E-05 | 0.01337 | 0.43557 | 0.02192 | 1521.03 | 288.8 | 2.138948 | | | |
| 7 | 383 | 1103 | 0.19057 | 11.37717 | 34.5 | 24.3 | 10.2 | 29.4 | 0.026331 | 16.91 | 348.661 | 1.6E-05 | 0.01474 | 0.48059 | 0.02191 | 1519.25 | 350.9 | 2.136451 | | | |
| 8 | 383 | 1198 | 0.19881 | 11.86910 | 34 | 24.3 | 9.7 | 29.15 | 0.026313 | 19.36 | 348.517 | 1.59E-05 | 0.01601 | 0.52177 | 0.02192 | 1521.47 | 414.2 | 2.139573 | | | |
| 9 | 383 | 1303 | 0.20749 | 12.38750 | 33.9 | 24.3 | 9.6 | 29.1 | 0.026309 | 21.31 | 348.488 | 1.59E-05 | 0.01742 | 0.56746 | 0.02192 | 1521.92 | 490.1 | 2.140198 | | | |
| 10 | 383 | 1403 | 0.21606 | 12.89925 | 34 | 24.5 | 9.5 | 29.25 | 0.02632 | 23.34 | 348.575 | 1.6E-05 | 0.01875 | 0.61116 | 0.02192 | 1520.59 | 568 | 2.138323 | | | |
| 11 | 383 | 1499 | 0.22494 | 13.42950 | 33.5 | 24.4 | 9.1 | 28.95 | 0.026298 | 26.43 | 348.402 | 1.59E-05 | 0.02004 | 0.65265 | 0.02193 | 1523.25 | 648.8 | 2.142076 | | | |
| 12 | 383 | 1597 | 0.24059 | 14.36330 | 34.2 | 24.4 | 9.8 | 29.3 | 0.026324 | 28.05 | 348.604 | 1.6E-05 | 0.02135 | 0.69572 | 0.02192 | 1520.14 | 735.8 | 2.137698 | | | |
| 13 | 383 | 1699 | 0.25020 | 14.93760 | 34.8 | 24.4 | 10.4 | 29.6 | 0.026345 | 28.57 | 348.776 | 1.6E-05 | 0.02271 | 0.74053 | 0.02191 | 1517.48 | 832.2 | 2.133958 | | | |
| 14 | 383 | 1802 | 0.25867 | 15.44270 | 34.8 | 24.3 | 10.5 | 29.55 | 0.026342 | 30.24 | 348.748 | 1.6E-05 | 0.02409 | 0.78535 | 0.02191 | 1517.92 | 936.2 | 2.134581 | | | |
| 15 | 383 | 1895 | 0.26758 | 15.97480 | 34.8 | 24.4 | 10.4 | 29.6 | 0.026345 | 32.67 | 348.776 | 1.6E-05 | 0.02533 | 0.82595 | 0.02191 | 1517.48 | 1035 | 2.133958 | | | |
| 16 | 383 | 1997 | 0.27625 | 16.49280 | 34.3 | 24.2 | 10.1 | 29.25 | 0.02632 | 35.89 | 348.575 | 1.6E-05 | 0.02669 | 0.86991 | 0.02192 | 1520.59 | 1151 | 2.138323 | | | |
| 17 | 383 | 2096 | 0.28493 | 17.01080 | 34.7 | 24.2 | 10.5 | 29.45 | 0.026335 | 36.71 | 348.69 | 1.6E-05 | 0.02802 | 0.91334 | 0.02191 | 1518.81 | 1267 | 2.135827 | | | |
| 18 | 383 | 2205 | 0.29410 | 17.55820 | 35.1 | 24.2 | 10.9 | 29.65 | 0.026349 | 37.65 | 348.805 | 1.6E-05 | 0.02948 | 0.96115 | 0.0219 | 1517.04 | 1401 | 2.133336 | | | |
| 19 | 383 | 2298 | 0.30354 | 18.12160 | 35.4 | 24.2 | 11.2 | 29.8 | 0.02636 | 39.02 | 348.892 | 1.6E-05 | 0.03072 | 1.00194 | 0.0219 | 1515.71 | 1522 | 2.131471 | | | |
| 20 | 383 | 2397 | 0.31225 | 18.64180 | 35.7 | 24.2 | 11.5 | 29.95 | 0.026371 | 40.2 | 348.978 | 1.6E-05 | 0.03204 | 1.04536 | 0.02189 | 1514.39 | 1655 | 2.129608 | | | |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | dellaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | | | |

| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |
|--------|---------|--------|---------|---------|--------|
| 0.0584 | 0.00025 | 0.0001 | 0.00038 | 0.05929 | 0.4448 |
| 0.0631 | 0.00025 | 0.0001 | 0.00038 | 0.06392 | 0.5852 |
| 0.068 | 0.00025 | 0.0001 | 0.00038 | 0.06872 | 0.7605 |
| 0.0737 | 0.00025 | 0.0001 | 0.00038 | 0.07433 | 0.9914 |
| 0.0737 | 0.00024 | 0.0001 | 0.00038 | 0.07433 | 1.0988 |
| 0.0707 | 0.00024 | 0.0001 | 0.00038 | 0.07142 | 1.1201 |
| 0.0693 | 0.00024 | 0.0001 | 0.00038 | 0.07004 | 1.1841 |
| 0.0729 | 0.00024 | 0.0001 | 0.00038 | 0.07358 | 1.4246 |
| 0.0737 | 0.00024 | 0.0001 | 0.00038 | 0.07433 | 1.5842 |
| 0.0744 | 0.00024 | 0.0001 | 0.00038 | 0.0751 | 1.7531 |
| 0.0777 | 0.00024 | 0.0001 | 0.00038 | 0.07835 | 2.0711 |
| 0.0722 | 0.00023 | 0.0001 | 0.00038 | 0.07284 | 2.0434 |
| 0.068 | 0.00023 | 0.0001 | 0.00038 | 0.06872 | 1.9631 |
| 0.0673 | 0.00023 | 0.0001 | 0.00038 | 0.06808 | 2.0591 |
| 0.068 | 0.00023 | 0.0001 | 0.00038 | 0.06872 | 2.2452 |
| 0.07 | 0.00023 | 0.0001 | 0.00038 | 0.07072 | 2.5384 |
| 0.0673 | 0.00023 | 0.0001 | 0.00038 | 0.06808 | 2.4992 |
| 0.0649 | 0.00023 | 0.0001 | 0.00038 | 0.06564 | 2.4715 |
| 0.0631 | 0.00023 | 0.0001 | 0.00038 | 0.06392 | 2.4941 |
| 0.0615 | 0.00023 | 0.0001 | 0.00038 | 0.0623 | 2.5041 |
| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |

| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |
|------------|---------|---------|------------|--------|-----------|---------|---------|
| 0.02307015 | 0.00002 | 3.1E-05 | 0.00998 | 0.0034 | 0.0074867 | 0.03466 | 2.50108 |
| 0.02333663 | 0.00002 | 3.1E-05 | 0.0083333 | 0.0034 | 0.0074867 | 0.03306 | 3.42473 |
| 0.02372819 | 0.00002 | 3.1E-05 | 0.0071531 | 0.0034 | 0.0074867 | 0.03222 | 4.53607 |
| 0.02413311 | 0.00002 | 3.1E-05 | 0.0062422 | 0.0034 | 0.0074867 | 0.03176 | 5.8789 |
| 0.02421575 | 0.00002 | 3.1E-05 | 0.0055556 | 0.0034 | 0.0074867 | 0.03131 | 7.31852 |
| 0.02421575 | 0.00002 | 3.1E-05 | 0.005 | 0.0034 | 0.0074867 | 0.03093 | 8.92646 |
| 0.02405102 | 0.00002 | 3.1E-05 | 0.0045331 | 0.0034 | 0.0074867 | 0.03051 | 10.7074 |
| 0.02425729 | 0.00002 | 3.1E-05 | 0.0041736 | 0.0034 | 0.0074867 | 0.03047 | 12.6219 |
| 0.02429897 | 0.00002 | 3.1E-05 | 0.0038373 | 0.0034 | 0.0074867 | 0.03033 | 14.8628 |
| 0.02417436 | 0.00002 | 3.1E-05 | 0.0035638 | 0.0034 | 0.0074867 | 0.03009 | 17.0922 |
| 0.02442487 | 0.00002 | 3.1E-05 | 0.0033356 | 0.0034 | 0.0074867 | 0.03019 | 19.5894 |
| 0.02413311 | 0.00002 | 3.1E-05 | 0.0031309 | 0.0034 | 0.0074867 | 0.02987 | 21.9763 |
| 0.02388851 | 0.00002 | 3.1E-05 | 0.0029429 | 0.0034 | 0.0074867 | 0.02959 | 24.626 |
| 0.02392893 | 0.00002 | 3.1E-05 | 0.0027747 | 0.0034 | 0.0074867 | 0.02956 | 27.6756 |
| 0.02388851 | 0.00002 | 3.1E-05 | 0.0026385 | 0.0034 | 0.0074867 | 0.02948 | 30.5165 |
| 0.02417436 | 0.00002 | 3.1E-05 | 0.0025038 | 0.0034 | 0.0074867 | 0.02966 | 34.1335 |
| 0.02401019 | 0.00002 | 3.1E-05 | 0.0023855 | 0.0034 | 0.0074867 | 0.02949 | 37.3636 |
| 0.02384823 | 0.00002 | 3.1E-05 | 0.0022676 | 0.0034 | 0.0074867 | 0.02932 | 41.0928 |
| 0.02372819 | 0.00002 | 3.1E-05 | 0.0021758 | 0.0034 | 0.0074867 | 0.0292 | 44.4244 |
| 0.02360935 | 0.00002 | 3.1E-05 | 0.0020859 | 0.0034 | 0.0074867 | 0.02907 | 48.113 |
| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |

| Svd | | 1.75 | L (m) | | | | 0.65 | | | | | | | | | | | | |
|-----|--------|-----------|---------|----------|--------|-------|-----------|----------|----------|-------|---------|-----------|---------|---------|---------|---------|-------|----------|--|
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | |
| 1 | 676 | 911 | 0.10389 | 6.20193 | 30.1 | 25 | 5.1 | 27.55 | 0.026196 | 10.1 | 347.594 | 1.58E-05 | 0.01218 | 0.2242 | 0.0388 | 2710.72 | 136.3 | 3.811956 | |
| 2 | 676 | 1043 | 0.12098 | 7.22158 | 30.9 | 25.1 | 5.8 | 28 | 0.026229 | 12.03 | 347.854 | 1.58E-05 | 0.01394 | 0.25688 | 0.03877 | 2703.57 | 178.4 | 3.801893 | |
| 3 | 676 | 1174 | 0.13828 | 8.25436 | 31.3 | 25.2 | 6.1 | 28.25 | 0.026247 | 14.93 | 347.998 | 1.59E-05 | 0.01569 | 0.28927 | 0.03875 | 2699.61 | 225.9 | 3.796321 | |
| 4 | 676 | 1306 | 0.15560 | 9.28872 | 31.6 | 25.2 | 6.4 | 28.4 | 0.026258 | 18.01 | 348.084 | 1.59E-05 | 0.01746 | 0.32187 | 0.03874 | 2697.23 | 279.4 | 3.792984 | |
| 5 | 676 | 1497 | 0.17314 | 10.33550 | 32.3 | 25.4 | 6.9 | 28.85 | 0.026291 | 20.66 | 348.344 | 1.59E-05 | 0.02001 | 0.36922 | 0.03871 | 2690.14 | 366.7 | 3.783003 | |
| 6 | 676 | 1755 | 0.19021 | 11.35430 | 32.5 | 25.4 | 7.1 | 28.95 | 0.026298 | 24.22 | 348.402 | 1.59E-05 | 0.02346 | 0.43292 | 0.03871 | 2688.56 | 503.9 | 3.780791 | |
| 7 | 676 | 1813 | 0.20759 | 12.39210 | 33.4 | 25.6 | 7.8 | 29.5 | 0.026338 | 26.22 | 348.719 | 1.6E-05 | 0.02424 | 0.44764 | 0.03867 | 2679.94 | 637 | 3.768663 | |
| 8 | 676 | 1853 | 0.22490 | 13.42530 | 34.9 | 25.7 | 9.2 | 30.3 | 0.026396 | 28.04 | 349.179 | 1.61E-05 | 0.02477 | 0.45812 | 0.03862 | 2667.47 | 559.8 | 3.751135 | |
| 9 | 676 | 2041 | 0.24223 | 14.45950 | 35.3 | 25.7 | 9.6 | 30.5 | 0.026411 | 28.93 | 349.294 | 1.61E-05 | 0.02728 | 0.50476 | 0.03861 | 2664.37 | 678.8 | 3.746774 | |
| 10 | 676 | 2041 | 0.25976 | 15.50640 | 36.6 | 25.8 | 10.8 | 31.2 | 0.026462 | 29.52 | 349.697 | 1.61E-05 | 0.02728 | 0.50534 | 0.03856 | 2653.57 | 677.8 | 3.731576 | |
| 11 | 676 | 2367 | 0.27709 | 16.54060 | 36.5 | 25.9 | 10.6 | 31.2 | 0.026462 | 34.22 | 349.697 | 1.61E-05 | 0.03164 | 0.58606 | 0.03856 | 2653.57 | 911.4 | 3.731576 | |
| 12 | 676 | 2534 | 0.27709 | 16.54060 | 36.3 | 26.1 | 10.2 | 31.2 | 0.026462 | 35.66 | 349.697 | 1.61E-05 | 0.03387 | 0.62741 | 0.03856 | 2653.57 | 1045 | 3.731576 | |
| 13 | 676 | 2307 | 0.22515 | 13.44000 | 33.4 | 26.1 | 7.3 | 29.75 | 0.026356 | 32.94 | 348.863 | 1.6E-05 | 0.03084 | 0.56984 | 0.03866 | 2676.03 | 869 | 3.763171 | |
| 14 | 676 | 2254 | 0.21626 | 12.90970 | 33.2 | 26.3 | 6.9 | 29.75 | 0.026356 | 32.15 | 348.863 | 1.6E-05 | 0.03013 | 0.55675 | 0.03866 | 2676.03 | 829.5 | 3.763171 | |
| 15 | 676 | 2040 | 0.19918 | 11.89020 | 33.1 | 26.4 | 6.7 | 29.75 | 0.026356 | 28.09 | 348.863 | 1.6E-05 | 0.02727 | 0.50389 | 0.03866 | 2676.03 | 679.5 | 3.763171 | |
| 16 | 676 | 2111 | 0.19918 | 11.89020 | 32.8 | 26.5 | 6.3 | 29.65 | 0.026349 | 29.88 | 348.805 | 1.6E-05 | 0.02822 | 0.52134 | 0.03866 | 2677.59 | 727.8 | 3.765366 | |
| 17 | 676 | 1326 | 0.13043 | 7.78600 | 30.8 | 26.6 | 4.2 | 28.7 | 0.02628 | 19.27 | 348.258 | 1.59E-05 | 0.01773 | 0.32696 | 0.03872 | 2692.5 | 287.8 | 3.786326 | |
| 18 | 676 | 1726 | 0.14752 | 8.80630 | 30.9 | 26.3 | 4.6 | 28.6 | 0.026273 | 22.51 | 348.2 | 1.59E-05 | 0.02307 | 0.42552 | 0.03873 | 2694.07 | 487.8 | 3.788543 | |
| 19 | 676 | 1644 | 0.13932 | 8.31652 | 30.6 | 26.2 | 4.4 | 28.4 | 0.026258 | 21 | 348.084 | 1.59E-05 | 0.02198 | 0.40517 | 0.03874 | 2697.23 | 442.8 | 3.792984 | |
| 20 | 676 | 1886 | 0.15117 | 9.02370 | 30.5 | 26.4 | 4.1 | 28.45 | 0.026262 | 26.53 | 348.113 | 1.59E-05 | 0.02521 | 0.46485 | 0.03874 | 2696.44 | 582.7 | 3.791873 | |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | |

| Ud/T/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |
|--------|---------|--------|---------|---------|--------|
| 0.1386 | 0.00027 | 0.0001 | 0.00038 | 0.13901 | 1.404 |
| 0.1219 | 0.00026 | 0.0001 | 0.00038 | 0.12232 | 1.4711 |
| 0.1159 | 0.00025 | 0.0001 | 0.00038 | 0.11635 | 1.737 |
| 0.1105 | 0.00025 | 0.0001 | 0.00038 | 0.11094 | 1.9981 |
| 0.1025 | 0.00024 | 0.0001 | 0.00038 | 0.10297 | 2.1271 |
| 0.0996 | 0.00024 | 0.0001 | 0.00038 | 0.10009 | 2.4245 |
| 0.0907 | 0.00024 | 0.0001 | 0.00038 | 0.09121 | 2.3917 |
| 0.0769 | 0.00024 | 0.0001 | 0.00038 | 0.07751 | 2.0181 |
| 0.0737 | 0.00023 | 0.0001 | 0.00038 | 0.07433 | 2.1504 |
| 0.0655 | 0.00023 | 0.0001 | 0.00038 | 0.06623 | 1.9549 |
| 0.0667 | 0.00023 | 0.0001 | 0.00038 | 0.06746 | 2.3082 |
| 0.0693 | 0.00023 | 0.0001 | 0.00038 | 0.07004 | 2.4907 |
| 0.0969 | 0.00024 | 0.0001 | 0.00038 | 0.09738 | 3.2072 |
| 0.1025 | 0.00024 | 0.0001 | 0.00038 | 0.10297 | 3.3103 |
| 0.1055 | 0.00024 | 0.0001 | 0.00038 | 0.10601 | 2.9774 |
| 0.1122 | 0.00024 | 0.0001 | 0.00038 | 0.11268 | 3.3667 |
| 0.1684 | 0.00026 | 0.0001 | 0.00038 | 0.16865 | 3.2496 |
| 0.1537 | 0.00025 | 0.0001 | 0.00038 | 0.15404 | 3.4677 |
| 0.1607 | 0.00025 | 0.0001 | 0.00038 | 0.16102 | 3.3815 |
| 0.1725 | 0.00025 | 0.0001 | 0.00038 | 0.17275 | 4.5831 |
| Ud/T/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |

| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |
|------------|---------|---------|------------|--------|-----------|---------|---------|
| 0.02566606 | 0.00002 | 3.2E-05 | 0.0054885 | 0.0034 | 0.0074867 | 0.0324 | 4.41468 |
| 0.02525357 | 0.00002 | 3.2E-05 | 0.0047939 | 0.0034 | 0.0074867 | 0.03162 | 5.64193 |
| 0.02503009 | 0.00002 | 3.2E-05 | 0.0042589 | 0.0034 | 0.0074867 | 0.03114 | 7.03346 |
| 0.02489789 | 0.00002 | 3.1E-05 | 0.0038285 | 0.0034 | 0.0074867 | 0.03081 | 8.60809 |
| 0.02450953 | 0.00002 | 3.1E-05 | 0.00334 | 0.0034 | 0.0074867 | 0.03026 | 11.0978 |
| 0.02442487 | 0.00002 | 3.1E-05 | 0.002849 | 0.0034 | 0.0074867 | 0.02999 | 15.1125 |
| 0.02396949 | 0.00002 | 3.1E-05 | 0.0027579 | 0.0034 | 0.0074867 | 0.02959 | 15.8884 |
| 0.02333663 | 0.00002 | 3.1E-05 | 0.0026983 | 0.0034 | 0.0074867 | 0.02905 | 16.2655 |
| 0.02318361 | 0.00002 | 3.1E-05 | 0.0024498 | 0.0034 | 0.0074867 | 0.02884 | 19.58 |
| 0.02266346 | 0.00002 | 3.1E-05 | 0.0024498 | 0.0034 | 0.0074867 | 0.02843 | 19.2633 |
| 0.02266346 | 0.00002 | 3.1E-05 | 0.0021124 | 0.0034 | 0.0074867 | 0.02832 | 25.8096 |
| 0.02266346 | 0.00002 | 3.1E-05 | 0.0019732 | 0.0034 | 0.0074867 | 0.02828 | 29.538 |
| 0.02376807 | 0.00002 | 3.1E-05 | 0.0021673 | 0.0034 | 0.0074867 | 0.02923 | 25.3962 |
| 0.02376807 | 0.00002 | 3.1E-05 | 0.0022183 | 0.0034 | 0.0074867 | 0.02924 | 24.2554 |
| 0.02376807 | 0.00002 | 3.1E-05 | 0.002451 | 0.0034 | 0.0074867 | 0.02932 | 19.9187 |
| 0.02384823 | 0.00002 | 3.1E-05 | 0.0023685 | 0.0034 | 0.0074867 | 0.02935 | 21.3624 |
| 0.02463763 | 0.00002 | 3.1E-05 | 0.0037707 | 0.0034 | 0.0074867 | 0.03057 | 8.79829 |
| 0.02472378 | 0.00002 | 3.1E-05 | 0.0028969 | 0.0034 | 0.0074867 | 0.03025 | 14.7581 |
| 0.02489789 | 0.00002 | 3.1E-05 | 0.0030414 | 0.0034 | 0.0074867 | 0.03045 | 13.484 |
| 0.02485413 | 0.00002 | 3.1E-05 | 0.0026511 | 0.0034 | 0.0074867 | 0.03027 | 17.6375 |
| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |

| S/d | | 1.75 | | L (m) | | 0.60000 | | | | | | | | | | | | | | |
|-----|--------|-----------|---------|----------|--------|---------|-----------|----------|----------|-------|---------|-----------|---------|---------|---------|---------|-------|----------|--|--|
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | | |
| 1 | 723 | 1300 | 0.10447 | 6.23637 | 29.3 | 26.3 | 3 | 27.8 | 0.026214 | 17.35 | 347.738 | 1.58E-05 | 0.01738 | 0.29926 | 0.04148 | 2894.94 | 259.3 | 4.071003 | | |
| 2 | 723 | 1018 | 0.10447 | 6.23626 | 30.7 | 26.3 | 4.4 | 28.5 | 0.026265 | 11.81 | 348.142 | 1.59E-05 | 0.01361 | 0.23462 | 0.04143 | 2883.07 | 158.7 | 4.054322 | | |
| 3 | 723 | 1274 | 0.12088 | 7.21591 | 30.6 | 26.5 | 4.1 | 28.55 | 0.026269 | 16.96 | 348.171 | 1.59E-05 | 0.01703 | 0.29364 | 0.04143 | 2882.23 | 248.5 | 4.053134 | | |
| 4 | 723 | 1290 | 0.13043 | 7.78585 | 30.9 | 26.4 | 4.5 | 28.65 | 0.026276 | 17.98 | 348.229 | 1.59E-05 | 0.01724 | 0.29738 | 0.04142 | 2880.54 | 254.7 | 4.050762 | | |
| 5 | 723 | 1455 | 0.14684 | 8.76550 | 31.5 | 26.4 | 5.1 | 28.95 | 0.026298 | 20.1 | 348.402 | 1.59E-05 | 0.01945 | 0.33559 | 0.0414 | 2875.49 | 323.8 | 4.043657 | | |
| 6 | 723 | 1780 | 0.16437 | 9.81204 | 32 | 26.4 | 5.6 | 29.2 | 0.026316 | 22.92 | 348.546 | 1.59E-05 | 0.02379 | 0.41071 | 0.04138 | 2871.29 | 484.3 | 4.037752 | | |
| 7 | 723 | 1860 | 0.18280 | 10.91234 | 32.9 | 26.5 | 6.4 | 29.7 | 0.026353 | 24.77 | 348.834 | 1.6E-05 | 0.02486 | 0.42953 | 0.04135 | 2862.92 | 528.2 | 4.025985 | | |
| 8 | 723 | 2069 | 0.19919 | 11.89073 | 33.4 | 26.6 | 6.8 | 30 | 0.026375 | 27.66 | 349.007 | 1.6E-05 | 0.02766 | 0.47803 | 0.04133 | 2857.92 | 653.1 | 4.018952 | | |
| 9 | 723 | 2143 | 0.21651 | 12.92445 | 34.2 | 26.6 | 7.6 | 30.4 | 0.026404 | 29.2 | 349.237 | 1.61E-05 | 0.02865 | 0.49545 | 0.0413 | 2851.27 | 699.9 | 4.009606 | | |
| 10 | 723 | 2311 | 0.23496 | 14.02590 | 35.2 | 26.7 | 8.5 | 30.95 | 0.026444 | 30.7 | 349.553 | 1.61E-05 | 0.03089 | 0.53478 | 0.04126 | 2842.18 | 812.8 | 3.996813 | | |
| 11 | 723 | 1024 | 0.08671 | 5.17640 | 29.5 | 26.4 | 3.1 | 27.95 | 0.026225 | 11.56 | 347.825 | 1.58E-05 | 0.01369 | 0.23579 | 0.04147 | 2892.39 | 160.8 | 4.067419 | | |
| 12 | 723 | 1149 | 0.09512 | 5.67808 | 29.7 | 26.6 | 3.1 | 28.15 | 0.02624 | 13.9 | 347.94 | 1.59E-05 | 0.01536 | 0.26466 | 0.04145 | 2888.99 | 202.4 | 4.062648 | | |
| 13 | 723 | 1364 | 0.10378 | 6.19521 | 29.3 | 26.6 | 2.7 | 27.95 | 0.026225 | 19.02 | 347.825 | 1.58E-05 | 0.01823 | 0.31408 | 0.04147 | 2892.39 | 285.3 | 4.067419 | | |
| 14 | 723 | 1494 | 0.11289 | 6.73890 | 29.6 | 26.6 | 3 | 28.1 | 0.026236 | 20.24 | 347.911 | 1.58E-05 | 0.01997 | 0.3441 | 0.04146 | 2889.84 | 342.2 | 4.06384 | | |
| 15 | 723 | 1687 | 0.12154 | 7.25550 | 29.9 | 26.6 | 3.3 | 28.25 | 0.026247 | 21.32 | 347.998 | 1.59E-05 | 0.02255 | 0.38864 | 0.04145 | 2887.3 | 436.1 | 4.060266 | | |
| 16 | 723 | 1818 | 0.12995 | 7.75708 | 30.2 | 26.7 | 3.5 | 28.45 | 0.026262 | 22.97 | 348.113 | 1.59E-05 | 0.0243 | 0.41896 | 0.04143 | 2883.92 | 506.2 | 4.055509 | | |
| 17 | 723 | 1967 | 0.13864 | 8.27578 | 30.4 | 26.7 | 3.7 | 28.55 | 0.026269 | 24.72 | 348.171 | 1.59E-05 | 0.02629 | 0.45337 | 0.04143 | 2882.23 | 592.4 | 4.053134 | | |
| 18 | 723 | 2057 | 0.14729 | 8.79259 | 30.6 | 26.7 | 3.9 | 28.65 | 0.026276 | 26.47 | 348.229 | 1.59E-05 | 0.0275 | 0.4742 | 0.04142 | 2880.54 | 647.7 | 4.050762 | | |
| 19 | 723 | 2076 | 0.15662 | 9.34951 | 31 | 26.8 | 4.2 | 28.9 | 0.026295 | 27.77 | 348.373 | 1.59E-05 | 0.02775 | 0.47878 | 0.0414 | 2876.33 | 659.3 | 4.04484 | | |
| 20 | 723 | 2126 | 0.16459 | 9.82537 | 31.4 | 26.9 | 4.5 | 29.15 | 0.026313 | 28.6 | 348.517 | 1.59E-05 | 0.02842 | 0.49051 | 0.04138 | 2872.13 | 691 | 4.038932 | | |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | | |

| Ud/T/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |
|--------|---------|--------|---------|---------|--------|
| 0.2357 | 0.00027 | 0.0001 | 0.00038 | 0.23591 | 4.0929 |
| 0.1607 | 0.00027 | 0.0001 | 0.00038 | 0.16102 | 1.9009 |
| 0.1725 | 0.00026 | 0.0001 | 0.00038 | 0.17275 | 2.9299 |
| 0.1571 | 0.00026 | 0.0001 | 0.00038 | 0.15745 | 2.8318 |
| 0.1386 | 0.00025 | 0.0001 | 0.00038 | 0.13901 | 2.7937 |
| 0.1263 | 0.00025 | 0.0001 | 0.00038 | 0.12666 | 2.9029 |
| 0.1105 | 0.00024 | 0.0001 | 0.00038 | 0.11094 | 2.7478 |
| 0.104 | 0.00024 | 0.0001 | 0.00038 | 0.10447 | 2.8892 |
| 0.093 | 0.00024 | 0.0001 | 0.00038 | 0.09358 | 2.7327 |
| 0.0832 | 0.00024 | 0.0001 | 0.00038 | 0.08379 | 2.5727 |
| 0.2281 | 0.00028 | 0.0001 | 0.00038 | 0.22832 | 2.6399 |
| 0.2281 | 0.00027 | 0.0001 | 0.00038 | 0.22832 | 3.1746 |
| 0.2619 | 0.00027 | 0.0001 | 0.00038 | 0.26208 | 4.9835 |
| 0.2357 | 0.00026 | 0.0001 | 0.00038 | 0.23591 | 4.7751 |
| 0.2143 | 0.00026 | 0.0001 | 0.00038 | 0.21451 | 4.5735 |
| 0.202 | 0.00026 | 0.0001 | 0.00038 | 0.20228 | 4.6454 |
| 0.1911 | 0.00025 | 0.0001 | 0.00038 | 0.19137 | 4.7306 |
| 0.1813 | 0.00025 | 0.0001 | 0.00038 | 0.18158 | 4.8057 |
| 0.1684 | 0.00025 | 0.0001 | 0.00038 | 0.16865 | 4.6831 |
| 0.1571 | 0.00025 | 0.0001 | 0.00038 | 0.15745 | 4.5034 |
| Ud/T/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |

| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |
|------------|---------|---------|------------|--------|-----------|---------|---------|
| 0.02543525 | 0.00002 | 3.2E-05 | 0.0038462 | 0.0034 | 0.0074867 | 0.03125 | 8.10219 |
| 0.02481053 | 0.00002 | 3.1E-05 | 0.0049116 | 0.0034 | 0.0074867 | 0.03134 | 4.97453 |
| 0.02476708 | 0.00002 | 3.1E-05 | 0.0039246 | 0.0034 | 0.0074867 | 0.03075 | 7.64181 |
| 0.02468063 | 0.00002 | 3.1E-05 | 0.003876 | 0.0034 | 0.0074867 | 0.03065 | 7.80893 |
| 0.02442487 | 0.00002 | 3.1E-05 | 0.0034364 | 0.0034 | 0.0074867 | 0.03024 | 9.79159 |
| 0.02421575 | 0.00002 | 3.1E-05 | 0.002809 | 0.0034 | 0.0074867 | 0.02981 | 14.4366 |
| 0.02380808 | 0.00002 | 3.1E-05 | 0.0026882 | 0.0034 | 0.0074867 | 0.02943 | 15.5452 |
| 0.02357 | 0.00002 | 3.1E-05 | 0.0024166 | 0.0034 | 0.0074867 | 0.02914 | 19.0328 |
| 0.02325987 | 0.00002 | 3.1E-05 | 0.0023332 | 0.0034 | 0.0074867 | 0.02887 | 20.2037 |
| 0.02284653 | 0.00002 | 3.1E-05 | 0.0021636 | 0.0034 | 0.0074867 | 0.02848 | 23.1497 |
| 0.02529875 | 0.00002 | 3.2E-05 | 0.0048828 | 0.0034 | 0.0074867 | 0.03171 | 5.09991 |
| 0.02511901 | 0.00002 | 3.2E-05 | 0.0043516 | 0.0034 | 0.0074867 | 0.03126 | 6.32556 |
| 0.02529875 | 0.00002 | 3.2E-05 | 0.0036657 | 0.0034 | 0.0074867 | 0.03105 | 8.85962 |
| 0.0251637 | 0.00002 | 3.2E-05 | 0.0033467 | 0.0034 | 0.0074867 | 0.0308 | 10.5376 |
| 0.02503009 | 0.00002 | 3.2E-05 | 0.0029638 | 0.0034 | 0.0074867 | 0.03053 | 13.3145 |
| 0.02485413 | 0.00002 | 3.1E-05 | 0.0027503 | 0.0034 | 0.0074867 | 0.03031 | 15.3411 |
| 0.02476708 | 0.00002 | 3.1E-05 | 0.0025419 | 0.0034 | 0.0074867 | 0.03016 | 17.8687 |
| 0.02468063 | 0.00002 | 3.1E-05 | 0.0024307 | 0.0034 | 0.0074867 | 0.03005 | 19.4665 |
| 0.02446713 | 0.00002 | 3.1E-05 | 0.0024085 | 0.0034 | 0.0074867 | 0.02987 | 19.695 |
| 0.02425729 | 0.00002 | 3.1E-05 | 0.0023518 | 0.0034 | 0.0074867 | 0.02968 | 20.5109 |
| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |

| S/d | 1.75 | L (m) | | | | | | | | | | | | | | | | | | |
|-----|--------|-----------|---------|----------|--------|-------|-----------|----------|----------|-------|---------|-----------|---------|---------|---------|---------|-------|----------|--|--|
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | | |
| 1 | 925 | 862 | 0.07806 | 4.65969 | 29.8 | 26.4 | 3.4 | 28.1 | 0.026236 | 8.539 | 347.911 | 1.58E-05 | 0.01152 | 0.15518 | 0.05304 | 3697.24 | 89.03 | 5.199242 | | |
| 2 | 925 | 586 | 0.06918 | 4.12944 | 29.8 | 26.5 | 3.3 | 28.15 | 0.02624 | 6.908 | 347.94 | 1.59E-05 | 0.00783 | 0.1055 | 0.05303 | 3696.15 | 41.14 | 5.197717 | | |
| 3 | 925 | 950 | 0.08669 | 5.17503 | 30.6 | 26.8 | 3.8 | 28.7 | 0.02628 | 9.408 | 348.258 | 1.59E-05 | 0.0127 | 0.17119 | 0.05299 | 3684.26 | 108 | 5.180993 | | |
| 4 | 925 | 1258 | 0.09514 | 5.67945 | 30.5 | 26.9 | 3.6 | 28.7 | 0.02628 | 11.96 | 348.258 | 1.59E-05 | 0.01682 | 0.22669 | 0.05299 | 3684.26 | 189.3 | 5.180993 | | |
| 5 | 925 | 1413 | 0.10423 | 6.22219 | 30.4 | 26.7 | 3.7 | 28.55 | 0.026269 | 13.97 | 348.171 | 1.59E-05 | 0.01889 | 0.25456 | 0.053 | 3687.5 | 239 | 5.185545 | | |
| 6 | 925 | 1189 | 0.11288 | 6.73859 | 31.4 | 26.3 | 5.1 | 28.85 | 0.026291 | 11.88 | 348.344 | 1.59E-05 | 0.01589 | 0.21431 | 0.05297 | 3681.03 | 169.1 | 5.176447 | | |
| 7 | 925 | 1335 | 0.12110 | 7.22873 | 31.8 | 26.2 | 5.6 | 29 | 0.026302 | 12.45 | 348.431 | 1.59E-05 | 0.01785 | 0.24069 | 0.05296 | 3677.8 | 213.1 | 5.171908 | | |
| 8 | 925 | 1486 | 0.13014 | 7.76842 | 31.7 | 26.1 | 5.6 | 28.9 | 0.026295 | 14.38 | 348.373 | 1.59E-05 | 0.01986 | 0.26787 | 0.05297 | 3679.95 | 264 | 5.174933 | | |
| 9 | 925 | 1552 | 0.13845 | 8.26455 | 31.8 | 26.2 | 5.6 | 29 | 0.026302 | 16.27 | 348.431 | 1.59E-05 | 0.02075 | 0.27981 | 0.05296 | 3677.8 | 288 | 5.171908 | | |
| 10 | 925 | 1691 | 0.14728 | 8.79154 | 32 | 26.2 | 5.8 | 29.1 | 0.026309 | 17.77 | 348.488 | 1.59E-05 | 0.0226 | 0.30492 | 0.05295 | 3675.65 | 341.8 | 5.168885 | | |
| 11 | 925 | 1772 | 0.15594 | 9.30856 | 31.9 | 26.2 | 5.7 | 29.05 | 0.026305 | 20.27 | 348.459 | 1.59E-05 | 0.02369 | 0.3195 | 0.05296 | 3676.73 | 375.3 | 5.170396 | | |
| 12 | 925 | 1695 | 0.16436 | 9.81130 | 32.8 | 26.3 | 6.5 | 29.55 | 0.026342 | 19.72 | 348.748 | 1.6E-05 | 0.02266 | 0.30587 | 0.05291 | 3666 | 343 | 5.155319 | | |
| 13 | 925 | 1850 | 0.17393 | 10.38251 | 32.9 | 26.3 | 6.6 | 29.6 | 0.026345 | 21.75 | 348.776 | 1.6E-05 | 0.02473 | 0.33387 | 0.05291 | 3664.94 | 408.5 | 5.153816 | | |
| 14 | 925 | 1951 | 0.18257 | 10.89830 | 33.2 | 26.3 | 6.9 | 29.75 | 0.026356 | 22.91 | 348.863 | 1.6E-05 | 0.02608 | 0.35218 | 0.05289 | 3661.73 | 454.2 | 5.149309 | | |
| 15 | 925 | 2115 | 0.19122 | 11.41470 | 33.4 | 26.3 | 7.1 | 29.85 | 0.026364 | 24.42 | 348.92 | 1.6E-05 | 0.02827 | 0.38185 | 0.05289 | 3659.6 | 533.8 | 5.146308 | | |
| 16 | 925 | 641 | 0.09968 | 5.95010 | 32.5 | 26.1 | 6.4 | 29.3 | 0.026324 | 7.372 | 348.604 | 1.6E-05 | 0.00857 | 0.11562 | 0.05293 | 3671.36 | 49.08 | 5.162849 | | |
| 17 | 925 | 1020 | 0.10884 | 6.48511 | 31.8 | 26.1 | 5.7 | 28.95 | 0.026298 | 9.843 | 348.402 | 1.59E-05 | 0.01363 | 0.18388 | 0.05296 | 3678.88 | 124.4 | 5.17342 | | |
| 18 | 925 | 1249 | 0.11630 | 6.94249 | 31.8 | 26.1 | 5.7 | 28.95 | 0.026298 | 11.28 | 348.402 | 1.59E-05 | 0.0167 | 0.22516 | 0.05296 | 3678.88 | 186.5 | 5.17342 | | |
| 19 | 925 | 1402 | 0.12558 | 7.49626 | 31.5 | 26.1 | 5.4 | 28.8 | 0.026287 | 13.89 | 348.315 | 1.59E-05 | 0.01874 | 0.25268 | 0.05298 | 3682.11 | 235.1 | 5.177962 | | |
| 20 | 925 | 1795 | 0.13914 | 8.30571 | 30.8 | 26.2 | 4.6 | 28.5 | 0.026265 | 20.03 | 348.142 | 1.59E-05 | 0.02399 | 0.32335 | 0.053 | 3688.58 | 385.7 | 5.187064 | | |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | | |

| Ud/T/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |
|--------|---------|--------|---------|---------|--------|
| 0.208 | 0.00029 | 0.0001 | 0.00038 | 0.20821 | 1.7779 |
| 0.2143 | 0.0003 | 0.0001 | 0.00038 | 0.21451 | 1.4819 |
| 0.1861 | 0.00028 | 0.0001 | 0.00038 | 0.18635 | 1.7531 |
| 0.1964 | 0.00027 | 0.0001 | 0.00038 | 0.19667 | 2.3523 |
| 0.1911 | 0.00027 | 0.0001 | 0.00038 | 0.19137 | 2.6742 |
| 0.1386 | 0.00026 | 0.0001 | 0.00038 | 0.13901 | 1.6515 |
| 0.1263 | 0.00026 | 0.0001 | 0.00038 | 0.12666 | 1.5764 |
| 0.1263 | 0.00026 | 0.0001 | 0.00038 | 0.12666 | 1.8211 |
| 0.1263 | 0.00025 | 0.0001 | 0.00038 | 0.12666 | 2.0606 |
| 0.1219 | 0.00025 | 0.0001 | 0.00038 | 0.12232 | 2.1736 |
| 0.1241 | 0.00025 | 0.0001 | 0.00038 | 0.12446 | 2.5231 |
| 0.1088 | 0.00025 | 0.0001 | 0.00038 | 0.10924 | 2.1546 |
| 0.1071 | 0.00024 | 0.0001 | 0.00038 | 0.1076 | 2.3402 |
| 0.1025 | 0.00024 | 0.0001 | 0.00038 | 0.10297 | 2.3591 |
| 0.0996 | 0.00024 | 0.0001 | 0.00038 | 0.10009 | 2.4443 |
| 0.1105 | 0.00027 | 0.0001 | 0.00038 | 0.11094 | 0.8179 |
| 0.1241 | 0.00027 | 0.0001 | 0.00038 | 0.12446 | 1.225 |
| 0.1241 | 0.00026 | 0.0001 | 0.00038 | 0.12446 | 1.4039 |
| 0.1309 | 0.00026 | 0.0001 | 0.00038 | 0.13133 | 1.8238 |
| 0.1537 | 0.00025 | 0.0001 | 0.00038 | 0.15404 | 3.0855 |
| Ud/T/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |

| UTavg/Tavg | U/I/I | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |
|------------|---------|---------|------------|--------|-----------|---------|---------|
| 0.0251637 | 0.00002 | 3.2E-05 | 0.0058005 | 0.0034 | 0.0074867 | 0.03222 | 2.86874 |
| 0.02511901 | 0.00002 | 3.2E-05 | 0.0085324 | 0.0034 | 0.0074867 | 0.03453 | 1.42076 |
| 0.02463763 | 0.00002 | 3.1E-05 | 0.0052632 | 0.0034 | 0.0074867 | 0.03144 | 3.39429 |
| 0.02463763 | 0.00002 | 3.1E-05 | 0.0039746 | 0.0034 | 0.0074867 | 0.03067 | 5.80685 |
| 0.02476708 | 0.00002 | 3.1E-05 | 0.0035386 | 0.0034 | 0.0074867 | 0.03056 | 7.30256 |
| 0.02450953 | 0.00002 | 3.1E-05 | 0.0042052 | 0.0034 | 0.0074867 | 0.03069 | 5.18879 |
| 0.02438276 | 0.00002 | 3.1E-05 | 0.0037453 | 0.0034 | 0.0074867 | 0.03035 | 6.46613 |
| 0.02446713 | 0.00002 | 3.1E-05 | 0.0033647 | 0.0034 | 0.0074867 | 0.03024 | 7.98443 |
| 0.02438276 | 0.00002 | 3.1E-05 | 0.0032216 | 0.0034 | 0.0074867 | 0.03011 | 8.66957 |
| 0.02429897 | 0.00002 | 3.1E-05 | 0.0029568 | 0.0034 | 0.0074867 | 0.02993 | 10.229 |
| 0.02434079 | 0.00002 | 3.1E-05 | 0.0028217 | 0.0034 | 0.0074867 | 0.02991 | 11.227 |
| 0.02392893 | 0.00002 | 3.1E-05 | 0.0029499 | 0.0034 | 0.0074867 | 0.02963 | 10.162 |
| 0.02388851 | 0.00002 | 3.1E-05 | 0.0027027 | 0.0034 | 0.0074867 | 0.0295 | 12.052 |
| 0.02376807 | 0.00002 | 3.1E-05 | 0.0025628 | 0.0034 | 0.0074867 | 0.02935 | 13.3317 |
| 0.02368844 | 0.00002 | 3.1E-05 | 0.0023641 | 0.0034 | 0.0074867 | 0.02922 | 15.5932 |
| 0.02413311 | 0.00002 | 3.1E-05 | 0.0078003 | 0.0034 | 0.0074867 | 0.03311 | 1.62507 |
| 0.02442487 | 0.00002 | 3.1E-05 | 0.004902 | 0.0034 | 0.0074867 | 0.03103 | 3.86042 |
| 0.02442487 | 0.00002 | 3.1E-05 | 0.0040032 | 0.0034 | 0.0074867 | 0.03051 | 5.69139 |
| 0.02455208 | 0.00002 | 3.1E-05 | 0.0035663 | 0.0034 | 0.0074867 | 0.0304 | 7.14689 |
| 0.02481053 | 0.00002 | 3.1E-05 | 0.0027855 | 0.0034 | 0.0074867 | 0.03028 | 11.6791 |
| UTavg/Tavg | U/I/I | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |

| St/d | | 1.75 | | L (m) | | 0.65000 | | | | | | | | | | | | | |
|------|--------|-----------|---------|---------|--------|---------|-----------|----------|----------|-------|---------|-----------|---------|---------|---------|---------|-------|----------|--|
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | |
| 1 | 1202 | 420 | 0.06988 | 4.17140 | 29.8 | 26 | 3.8 | 27.9 | 0.026222 | 6.128 | 347.796 | 1.58E-05 | 0.00561 | 0.05817 | 0.06895 | 4810.05 | 16.27 | 6.76414 | |
| 2 | 1202 | 822 | 0.08761 | 5.22994 | 30.3 | 26 | 4.3 | 28.15 | 0.02624 | 8.604 | 347.94 | 1.59E-05 | 0.01099 | 0.11389 | 0.06892 | 4803 | 62.3 | 6.754223 | |
| 3 | 1202 | 920 | 0.09534 | 5.69152 | 30.7 | 26 | 4.7 | 28.35 | 0.026254 | 9.209 | 348.056 | 1.59E-05 | 0.0123 | 0.12751 | 0.06889 | 4797.37 | 77.99 | 6.746307 | |
| 4 | 1202 | 1009 | 0.10424 | 6.22230 | 31.3 | 26 | 5.3 | 28.65 | 0.026276 | 9.763 | 348.229 | 1.59E-05 | 0.01349 | 0.13991 | 0.06886 | 4788.95 | 93.74 | 6.734461 | |
| 5 | 1202 | 1122 | 0.11243 | 6.71160 | 31.7 | 26.1 | 5.6 | 28.9 | 0.026295 | 10.73 | 348.373 | 1.59E-05 | 0.015 | 0.15564 | 0.06883 | 4781.95 | 115.8 | 6.724616 | |
| 6 | 1202 | 1237 | 0.12134 | 7.24321 | 32.2 | 26 | 6.2 | 29.1 | 0.026309 | 11.28 | 348.488 | 1.59E-05 | 0.01654 | 0.17165 | 0.06881 | 4776.36 | 140.7 | 6.716757 | |
| 7 | 1202 | 1358 | 0.12973 | 7.74438 | 32.6 | 26 | 6.6 | 29.3 | 0.026324 | 12.11 | 348.604 | 1.6E-05 | 0.01815 | 0.18851 | 0.06879 | 4770.78 | 169.5 | 6.708913 | |
| 8 | 1202 | 1471 | 0.13886 | 8.28891 | 33 | 26 | 7 | 29.5 | 0.026338 | 13.07 | 348.719 | 1.6E-05 | 0.01966 | 0.20426 | 0.06876 | 4765.21 | 198.8 | 6.701084 | |
| 9 | 1202 | 1525 | 0.14744 | 8.80131 | 33.6 | 26 | 7.6 | 29.8 | 0.02636 | 13.66 | 348.892 | 1.6E-05 | 0.02039 | 0.21186 | 0.06873 | 4756.88 | 213.5 | 6.689368 | |
| 10 | 1202 | 1626 | 0.15622 | 9.32526 | 33.8 | 26 | 7.8 | 29.9 | 0.026367 | 14.83 | 348.949 | 1.6E-05 | 0.02174 | 0.22593 | 0.06872 | 4754.11 | 242.7 | 6.685471 | |
| 11 | 1202 | 631 | 0.07351 | 4.38784 | 29.7 | 26 | 3.7 | 27.85 | 0.026218 | 6.963 | 347.767 | 1.58E-05 | 0.00843 | 0.08738 | 0.06895 | 4811.47 | 36.74 | 6.766126 | |
| 12 | 1202 | 782 | 0.08215 | 4.90402 | 30.2 | 26 | 4.2 | 28.1 | 0.026236 | 7.656 | 347.911 | 1.58E-05 | 0.01045 | 0.10834 | 0.06892 | 4804.41 | 56.39 | 6.756205 | |
| 13 | 1202 | 946 | 0.09034 | 5.39280 | 30.8 | 26.1 | 4.7 | 28.45 | 0.026262 | 8.266 | 348.113 | 1.59E-05 | 0.01265 | 0.13113 | 0.06888 | 4794.56 | 82.44 | 6.742355 | |
| 14 | 1202 | 1110 | 0.09922 | 5.92284 | 30.9 | 26 | 4.9 | 28.45 | 0.026262 | 9.663 | 348.113 | 1.59E-05 | 0.01484 | 0.15386 | 0.06888 | 4794.56 | 113.5 | 6.742355 | |
| 15 | 1202 | 1254 | 0.10756 | 6.42054 | 30.8 | 25.9 | 4.9 | 28.35 | 0.026254 | 11.24 | 348.056 | 1.59E-05 | 0.01676 | 0.1738 | 0.06889 | 4797.37 | 144.9 | 6.746307 | |
| 16 | 1202 | 1394 | 0.11675 | 6.96958 | 31.2 | 25.9 | 5.3 | 28.55 | 0.026269 | 12.24 | 348.171 | 1.59E-05 | 0.01863 | 0.19326 | 0.06887 | 4791.75 | 179 | 6.738406 | |
| 17 | 1202 | 1530 | 0.12494 | 7.45794 | 31.4 | 25.9 | 5.5 | 28.65 | 0.026276 | 13.5 | 348.229 | 1.59E-05 | 0.02045 | 0.21215 | 0.06886 | 4788.95 | 215.5 | 6.734461 | |
| 18 | 1202 | 956 | 0.09261 | 5.52835 | 30.6 | 26 | 4.6 | 28.3 | 0.026251 | 8.879 | 348.027 | 1.59E-05 | 0.01278 | 0.13248 | 0.0689 | 4798.78 | 84.23 | 6.748285 | |
| 19 | 1202 | 1090 | 0.10097 | 6.02721 | 31.2 | 26.1 | 5.1 | 28.65 | 0.026276 | 9.51 | 348.229 | 1.59E-05 | 0.01457 | 0.15114 | 0.06886 | 4788.95 | 109.4 | 6.734461 | |
| 20 | 1202 | 1276 | 0.11407 | 6.80904 | 31.5 | 26 | 5.5 | 28.75 | 0.026284 | 11.26 | 348.286 | 1.59E-05 | 0.01706 | 0.17696 | 0.06885 | 4786.15 | 149.9 | 6.73052 | |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | |

| Ud/T/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |
|--------|---------|--------|---------|---------|--------|
| 0.1861 | 0.0003 | 0.0001 | 0.00038 | 0.18635 | 1.1416 |
| 0.1644 | 0.00028 | 0.0001 | 0.00038 | 0.16475 | 1.401 |
| 0.1504 | 0.00027 | 0.0001 | 0.00038 | 0.15078 | 1.3886 |
| 0.1334 | 0.00027 | 0.0001 | 0.00038 | 0.13379 | 1.3049 |
| 0.1263 | 0.00026 | 0.0001 | 0.00038 | 0.12666 | 1.3593 |
| 0.114 | 0.00026 | 0.0001 | 0.00038 | 0.11449 | 1.2918 |
| 0.1071 | 0.00026 | 0.0001 | 0.00038 | 0.1076 | 1.3031 |
| 0.101 | 0.00025 | 0.0001 | 0.00038 | 0.10151 | 1.3271 |
| 0.093 | 0.00025 | 0.0001 | 0.00038 | 0.09358 | 1.2693 |
| 0.0907 | 0.00025 | 0.0001 | 0.00038 | 0.09121 | 1.3529 |
| 0.1911 | 0.00029 | 0.0001 | 0.00038 | 0.19137 | 1.3324 |
| 0.1684 | 0.00028 | 0.0001 | 0.00038 | 0.16865 | 1.2913 |
| 0.1504 | 0.00028 | 0.0001 | 0.00038 | 0.15078 | 1.2463 |
| 0.1443 | 0.00027 | 0.0001 | 0.00038 | 0.14465 | 1.3834 |
| 0.1443 | 0.00027 | 0.0001 | 0.00038 | 0.14465 | 1.6261 |
| 0.1334 | 0.00026 | 0.0001 | 0.00038 | 0.13379 | 1.6375 |
| 0.1286 | 0.00026 | 0.0001 | 0.00038 | 0.12895 | 1.7411 |
| 0.1537 | 0.00027 | 0.0001 | 0.00038 | 0.15404 | 1.3678 |
| 0.1386 | 0.00027 | 0.0001 | 0.00038 | 0.13901 | 1.3219 |
| 0.1286 | 0.00026 | 0.0001 | 0.00038 | 0.12895 | 1.4509 |
| Ud/T/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |

| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |
|------------|---------|---------|------------|--------|-----------|---------|---------|
| 0.02534409 | 0.00002 | 3.2E-05 | 0.0119048 | 0.0034 | 0.0074867 | 0.03847 | 0.62599 |
| 0.02511901 | 0.00002 | 3.2E-05 | 0.0060827 | 0.0034 | 0.0074867 | 0.03239 | 2.01802 |
| 0.0249418 | 0.00002 | 3.2E-05 | 0.0054348 | 0.0034 | 0.0074867 | 0.03179 | 2.47955 |
| 0.02468063 | 0.00002 | 3.1E-05 | 0.0049554 | 0.0034 | 0.0074867 | 0.03127 | 2.93134 |
| 0.02446713 | 0.00002 | 3.1E-05 | 0.0044563 | 0.0034 | 0.0074867 | 0.0308 | 3.56773 |
| 0.02429897 | 0.00002 | 3.1E-05 | 0.004042 | 0.0034 | 0.0074867 | 0.03043 | 4.28314 |
| 0.02413311 | 0.00002 | 3.1E-05 | 0.0036819 | 0.0034 | 0.0074867 | 0.03012 | 5.1058 |
| 0.02396949 | 0.00002 | 3.1E-05 | 0.003399 | 0.0034 | 0.0074867 | 0.02985 | 5.93518 |
| 0.02372819 | 0.00002 | 3.1E-05 | 0.0032787 | 0.0034 | 0.0074867 | 0.02961 | 6.32122 |
| 0.02364883 | 0.00002 | 3.1E-05 | 0.003075 | 0.0034 | 0.0074867 | 0.02945 | 7.14771 |
| 0.02538959 | 0.00002 | 3.2E-05 | 0.0079239 | 0.0034 | 0.0074867 | 0.03415 | 1.25457 |
| 0.0251637 | 0.00002 | 3.2E-05 | 0.0063939 | 0.0034 | 0.0074867 | 0.03267 | 1.84204 |
| 0.02485413 | 0.00002 | 3.1E-05 | 0.0052854 | 0.0034 | 0.0074867 | 0.03162 | 2.60701 |
| 0.02485413 | 0.00002 | 3.1E-05 | 0.0045045 | 0.0034 | 0.0074867 | 0.03113 | 3.53396 |
| 0.0249418 | 0.00002 | 3.2E-05 | 0.0039872 | 0.0034 | 0.0074867 | 0.03092 | 4.48067 |
| 0.02476708 | 0.00002 | 3.1E-05 | 0.0035868 | 0.0034 | 0.0074867 | 0.03058 | 5.4736 |
| 0.02468063 | 0.00002 | 3.1E-05 | 0.003268 | 0.0034 | 0.0074867 | 0.03037 | 6.54601 |
| 0.02498587 | 0.00002 | 3.2E-05 | 0.0052301 | 0.0034 | 0.0074867 | 0.03169 | 2.66908 |
| 0.02468063 | 0.00002 | 3.1E-05 | 0.0045872 | 0.0034 | 0.0074867 | 0.03104 | 3.39619 |
| 0.02459478 | 0.00002 | 3.1E-05 | 0.0039185 | 0.0034 | 0.0074867 | 0.03061 | 4.58738 |
| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |

| Svd | | 2 | | L (m) | | 0.24000 | | | | | | | | | | | | | | |
|-----|--------|-----------|---------|----------|--------|---------|-----------|----------|-----------|---------|---------|-----------|--------|----------|----------|----------|--------|----------|--|--|
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | | |
| 1 | 383 | 456 | 0.13892 | 8.29374 | 35.3 | 24.4 | 10.9 | 29.85 | 0.0263637 | 8.39633 | 348.92 | 1.6E-05 | 0.0061 | 0.198834 | 0.021898 | 1515.271 | 59.906 | 3.788177 | | |
| 2 | 383 | 553 | 0.14689 | 8.76981 | 35.2 | 24.6 | 10.6 | 29.9 | 0.0263673 | 9.65228 | 348.949 | 1.6E-05 | 0.0074 | 0.24115 | 0.021896 | 1514.829 | 88.092 | 3.787074 | | |
| 3 | 383 | 655 | 0.15578 | 9.30000 | 35.1 | 24.8 | 10.3 | 29.95 | 0.026371 | 11.1693 | 348.978 | 1.6E-05 | 0.0088 | 0.285653 | 0.021894 | 1514.388 | 123.57 | 3.785971 | | |
| 4 | 383 | 751 | 0.16487 | 9.84270 | 34.7 | 24.8 | 9.9 | 29.75 | 0.0263564 | 13.0235 | 348.863 | 1.6E-05 | 0.01 | 0.327412 | 0.021901 | 1516.154 | 162.53 | 3.790386 | | |
| 5 | 383 | 851 | 0.17311 | 10.33480 | 34.5 | 24.8 | 9.7 | 29.65 | 0.0263491 | 14.6584 | 348.805 | 1.6E-05 | 0.0114 | 0.370947 | 0.021905 | 1517.039 | 208.75 | 3.792597 | | |
| 6 | 383 | 998 | 0.18262 | 10.90250 | 34.3 | 24.8 | 9.5 | 29.55 | 0.0263418 | 16.6611 | 348.748 | 1.6E-05 | 0.0133 | 0.434952 | 0.021908 | 1517.924 | 287.17 | 3.794811 | | |
| 7 | 383 | 1053 | 0.19035 | 11.36420 | 34 | 24.7 | 9.3 | 29.35 | 0.0263273 | 18.5016 | 348.632 | 1.6E-05 | 0.0141 | 0.458771 | 0.021916 | 1519.697 | 319.85 | 3.799243 | | |
| 8 | 383 | 1141 | 0.19900 | 11.88050 | 34.2 | 24.8 | 9.4 | 29.5 | 0.0263382 | 19.9975 | 348.719 | 1.6E-05 | 0.0153 | 0.497234 | 0.02191 | 1518.367 | 376.4 | 3.795918 | | |
| 9 | 383 | 1253 | 0.20810 | 12.42390 | 34.8 | 24.9 | 9.9 | 29.85 | 0.0263637 | 20.7442 | 348.92 | 1.6E-05 | 0.0167 | 0.546358 | 0.021898 | 1515.271 | 452.32 | 3.788177 | | |
| 10 | 383 | 1350 | 0.21608 | 12.90030 | 34.9 | 25 | 9.9 | 29.95 | 0.026371 | 22.3594 | 348.978 | 1.6E-05 | 0.018 | 0.588751 | 0.021894 | 1514.388 | 524.93 | 3.785971 | | |
| 11 | 383 | 1460 | 0.22475 | 13.41790 | 34.7 | 24.9 | 9.8 | 29.8 | 0.02636 | 24.4466 | 348.892 | 1.6E-05 | 0.0195 | 0.636566 | 0.021899 | 1515.713 | 614.19 | 3.789282 | | |
| 12 | 383 | 1540 | 0.23316 | 13.91980 | 35.5 | 25 | 10.5 | 30.25 | 0.0263928 | 24.5252 | 349.151 | 1.6E-05 | 0.0206 | 0.671945 | 0.021883 | 1511.745 | 682.57 | 3.779363 | | |
| 13 | 383 | 1648 | 0.24204 | 14.45010 | 35 | 25 | 10 | 30 | 0.0263746 | 27.7701 | 349.007 | 1.6E-05 | 0.022 | 0.718772 | 0.021892 | 1513.947 | 782.15 | 3.784868 | | |
| 14 | 383 | 1758 | 0.25115 | 14.99400 | 35 | 25 | 10 | 30 | 0.0263746 | 29.9 | 349.007 | 1.6E-05 | 0.0235 | 0.766748 | 0.021892 | 1513.947 | 890.05 | 3.784868 | | |
| 15 | 383 | 1840 | 0.25980 | 15.51060 | 35.1 | 25 | 10.1 | 30.05 | 0.0263782 | 31.6746 | 349.035 | 1.6E-05 | 0.0246 | 0.802578 | 0.02189 | 1513.506 | 974.9 | 3.783766 | | |
| 16 | 383 | 1992 | 0.26821 | 16.01250 | 35 | 25 | 10 | 30 | 0.0263746 | 34.1 | 349.007 | 1.6E-05 | 0.0266 | 0.868806 | 0.021892 | 1513.947 | 1142.8 | 3.784868 | | |
| 17 | 383 | 2040 | 0.27588 | 16.47030 | 34.9 | 24.9 | 10 | 29.9 | 0.0263673 | 36.0876 | 348.949 | 1.6E-05 | 0.0273 | 0.889595 | 0.021896 | 1514.829 | 1198.8 | 3.787074 | | |
| 18 | 383 | 2088 | 0.28601 | 17.07510 | 35 | 25 | 10 | 30 | 0.0263746 | 38.7759 | 349.007 | 1.6E-05 | 0.0279 | 0.910677 | 0.021892 | 1513.947 | 1255.6 | 3.784868 | | |
| 19 | 383 | 2150 | 0.29558 | 17.64630 | 35.3 | 25 | 10.3 | 30.15 | 0.0263855 | 40.1907 | 349.093 | 1.6E-05 | 0.0287 | 0.93795 | 0.021887 | 1512.625 | 1330.7 | 3.781563 | | |
| 20 | 383 | 2246 | 0.30249 | 18.05890 | 35.8 | 25 | 10.8 | 30.4 | 0.0264037 | 40.1158 | 349.237 | 1.61E-05 | 0.03 | 0.980234 | 0.021878 | 1510.426 | 1451.3 | 3.776066 | | |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | | |

| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |
|--------|----------|--------|-------|--------|--------|
| 0.0649 | 0.000253 | 0.0001 | 4E-04 | 0.0656 | 0.5511 |
| 0.0667 | 0.000251 | 0.0001 | 4E-04 | 0.0675 | 0.6511 |
| 0.0687 | 0.000249 | 0.0001 | 4E-04 | 0.0694 | 0.7749 |
| 0.0714 | 0.000246 | 0.0001 | 4E-04 | 0.0721 | 0.9393 |
| 0.0729 | 0.000245 | 0.0001 | 4E-04 | 0.0736 | 1.0786 |
| 0.0744 | 0.000243 | 0.0001 | 4E-04 | 0.0751 | 1.2513 |
| 0.076 | 0.000242 | 0.0001 | 4E-04 | 0.0767 | 1.4189 |
| 0.0752 | 0.00024 | 0.0001 | 4E-04 | 0.0759 | 1.5176 |
| 0.0714 | 0.000239 | 0.0001 | 4E-04 | 0.0721 | 1.4961 |
| 0.0714 | 0.000238 | 0.0001 | 4E-04 | 0.0721 | 1.6126 |
| 0.0722 | 0.000237 | 0.0001 | 4E-04 | 0.0728 | 1.7808 |
| 0.0673 | 0.000236 | 0.0001 | 4E-04 | 0.0681 | 1.6698 |
| 0.0707 | 0.000235 | 0.0001 | 4E-04 | 0.0714 | 1.9832 |
| 0.0707 | 0.000234 | 0.0001 | 4E-04 | 0.0714 | 2.1353 |
| 0.07 | 0.000233 | 0.0001 | 4E-04 | 0.0707 | 2.2401 |
| 0.0707 | 0.000232 | 0.0001 | 4E-04 | 0.0714 | 2.4353 |
| 0.0707 | 0.000232 | 0.0001 | 4E-04 | 0.0714 | 2.5772 |
| 0.0707 | 0.000231 | 0.0001 | 4E-04 | 0.0714 | 2.7692 |
| 0.0687 | 0.00023 | 0.0001 | 4E-04 | 0.0694 | 2.7883 |
| 0.0655 | 0.00023 | 0.0001 | 4E-04 | 0.0662 | 2.657 |
| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |

| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |
|------------|---------|-------|------------|--------|--------|--------|--------|
| 0.0236884 | 0.00002 | 3E-05 | 0.0109649 | 0.0034 | 0.0075 | 0.0362 | 2.1703 |
| 0.0236488 | 0.00002 | 3E-05 | 0.0090416 | 0.0034 | 0.0075 | 0.034 | 2.9961 |
| 0.0236093 | 0.00002 | 3E-05 | 0.0076336 | 0.0034 | 0.0075 | 0.0326 | 4.0249 |
| 0.0237681 | 0.00002 | 3E-05 | 0.0066578 | 0.0034 | 0.0075 | 0.0318 | 5.1721 |
| 0.0238482 | 0.00002 | 3E-05 | 0.0058754 | 0.0034 | 0.0075 | 0.0313 | 6.5257 |
| 0.0239289 | 0.00002 | 3E-05 | 0.00501 | 0.0034 | 0.0075 | 0.0307 | 8.8205 |
| 0.024092 | 0.00002 | 3E-05 | 0.0047483 | 0.0034 | 0.0075 | 0.0307 | 9.812 |
| 0.0239695 | 0.00002 | 3E-05 | 0.0043821 | 0.0034 | 0.0075 | 0.0304 | 11.398 |
| 0.0236884 | 0.00002 | 3E-05 | 0.0039904 | 0.0034 | 0.0075 | 0.0299 | 13.534 |
| 0.0236093 | 0.00002 | 3E-05 | 0.0037037 | 0.0034 | 0.0075 | 0.0297 | 15.596 |
| 0.0237282 | 0.00002 | 3E-05 | 0.0034247 | 0.0034 | 0.0075 | 0.0297 | 18.224 |
| 0.0233752 | 0.00002 | 3E-05 | 0.0032468 | 0.0034 | 0.0075 | 0.0293 | 20.005 |
| 0.02357 | 0.00002 | 3E-05 | 0.003034 | 0.0034 | 0.0075 | 0.0294 | 22.975 |
| 0.02357 | 0.00002 | 3E-05 | 0.0028441 | 0.0034 | 0.0075 | 0.0293 | 26.076 |
| 0.0235308 | 0.00002 | 3E-05 | 0.0027174 | 0.0034 | 0.0075 | 0.0292 | 28.484 |
| 0.02357 | 0.00002 | 3E-05 | 0.00251 | 0.0034 | 0.0075 | 0.0292 | 33.34 |
| 0.0236488 | 0.00002 | 3E-05 | 0.002451 | 0.0034 | 0.0075 | 0.0292 | 35.028 |
| 0.02357 | 0.00002 | 3E-05 | 0.0023946 | 0.0034 | 0.0075 | 0.0291 | 36.583 |
| 0.0234527 | 0.00002 | 3E-05 | 0.0023256 | 0.0034 | 0.0075 | 0.029 | 38.617 |
| 0.0232599 | 0.00002 | 3E-05 | 0.0022262 | 0.0034 | 0.0075 | 0.0288 | 41.844 |
| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |

| Svd | | L (m) | | | | | | | | | | | | | | | | | | |
|-----|--------|-----------|---------|----------|--------|-------|-----------|----------|-----------|---------|---------|-----------|--------|----------|----------|----------|--------|----------|--|--|
| 2 | | 0.65 | | | | | | | | | | | | | | | | | | |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | | |
| 1 | 676 | 711 | 0.10334 | 6.16724 | 28.8 | 24 | 4.8 | 26.4 | 0.0261121 | 10.6488 | 346.928 | 1.57E-05 | 0.0095 | 0.174647 | 0.038871 | 2729.155 | 83.244 | 6.822887 | | |
| 2 | 676 | 971 | 0.12031 | 7.17964 | 29.2 | 24.2 | 5 | 26.7 | 0.0261341 | 13.843 | 347.102 | 1.57E-05 | 0.013 | 0.238632 | 0.038852 | 2724.327 | 155.14 | 6.810817 | | |
| 3 | 676 | 1057 | 0.13839 | 8.25858 | 29.7 | 24.2 | 5.5 | 26.95 | 0.0261523 | 16.6395 | 347.247 | 1.57E-05 | 0.0141 | 0.259875 | 0.038836 | 2720.314 | 183.72 | 6.800786 | | |
| 4 | 676 | 1096 | 0.15763 | 9.40685 | 31.3 | 24.4 | 6.9 | 27.85 | 0.026218 | 17.165 | 347.767 | 1.58E-05 | 0.0147 | 0.269868 | 0.038778 | 2705.95 | 197.07 | 6.764875 | | |
| 5 | 676 | 1214 | 0.17213 | 10.27210 | 32.1 | 24.6 | 7.5 | 28.35 | 0.0262544 | 18.8043 | 348.056 | 1.59E-05 | 0.0162 | 0.299171 | 0.038746 | 2698.024 | 241.48 | 6.74506 | | |
| 6 | 676 | 1361 | 0.18951 | 11.30960 | 32.7 | 25 | 7.7 | 28.85 | 0.0262909 | 22.1718 | 348.344 | 1.59E-05 | 0.0182 | 0.335675 | 0.038713 | 2690.136 | 303.12 | 6.725339 | | |
| 7 | 676 | 1615 | 0.20760 | 12.38890 | 32.7 | 24.8 | 7.9 | 28.75 | 0.0262836 | 26.9392 | 348.286 | 1.59E-05 | 0.0216 | 0.398255 | 0.03872 | 2691.71 | 426.92 | 6.729276 | | |
| 8 | 676 | 1924 | 0.22366 | 13.34720 | 32.7 | 24.8 | 7.9 | 28.75 | 0.0262836 | 30.1073 | 348.286 | 1.59E-05 | 0.0257 | 0.474453 | 0.03872 | 2691.71 | 605.92 | 6.729276 | | |
| 9 | 676 | 2040 | 0.24063 | 14.35970 | 33.6 | 24.9 | 8.7 | 29.25 | 0.02632 | 31.6001 | 348.575 | 1.6E-05 | 0.0273 | 0.503475 | 0.038688 | 2683.852 | 680.32 | 6.709631 | | |
| 10 | 676 | 2148 | 0.25806 | 15.40030 | 35.1 | 25 | 10.1 | 30.05 | 0.0263782 | 31.2388 | 349.035 | 1.6E-05 | 0.0287 | 0.53083 | 0.038637 | 2671.358 | 762.74 | 6.678396 | | |
| 11 | 676 | 2348 | 0.25806 | 15.40030 | 34.6 | 25 | 9.6 | 29.8 | 0.02636 | 32.8885 | 348.892 | 1.6E-05 | 0.0314 | 0.580017 | 0.038653 | 2675.252 | 900.01 | 6.688132 | | |
| 12 | 676 | 862 | 0.10357 | 6.18069 | 29 | 24.8 | 4.2 | 26.9 | 0.0261487 | 12.2061 | 347.218 | 1.57E-05 | 0.0115 | 0.211915 | 0.038839 | 2721.116 | 122.2 | 6.802791 | | |
| 13 | 676 | 1071 | 0.12051 | 7.19182 | 29 | 25.1 | 3.9 | 27.05 | 0.0261596 | 17.7904 | 347.304 | 1.57E-05 | 0.0143 | 0.263361 | 0.038829 | 2718.712 | 188.67 | 6.796781 | | |
| 14 | 676 | 1323 | 0.13851 | 8.26587 | 29.6 | 25.1 | 4.5 | 27.35 | 0.0261815 | 20.3504 | 347.478 | 1.58E-05 | 0.0177 | 0.325491 | 0.03881 | 2713.915 | 287.52 | 6.784787 | | |
| 15 | 676 | 1422 | 0.15608 | 9.31402 | 30.2 | 25.1 | 5.1 | 27.65 | 0.0262034 | 22.7798 | 347.651 | 1.58E-05 | 0.019 | 0.350022 | 0.038791 | 2709.131 | 331.91 | 6.772829 | | |
| 16 | 676 | 1888 | 0.17278 | 10.31110 | 29.8 | 25.1 | 4.7 | 27.45 | 0.0261888 | 30.3109 | 347.536 | 1.58E-05 | 0.0252 | 0.464572 | 0.038803 | 2712.319 | 585.39 | 6.780797 | | |
| 17 | 676 | 1368 | 0.16364 | 9.76535 | 31 | 25.1 | 5.9 | 28.05 | 0.0262326 | 21.6215 | 347.882 | 1.58E-05 | 0.0183 | 0.336954 | 0.038765 | 2702.775 | 306.87 | 6.756938 | | |
| 18 | 676 | 1446 | 0.15873 | 9.47239 | 31 | 25.2 | 5.8 | 28.1 | 0.0262362 | 20.6915 | 347.911 | 1.58E-05 | 0.0193 | 0.356196 | 0.038762 | 2701.982 | 342.82 | 6.754956 | | |
| 19 | 676 | 1668 | 0.17326 | 10.33929 | 30.6 | 25.2 | 5.4 | 27.9 | 0.0262216 | 26.493 | 347.796 | 1.58E-05 | 0.0223 | 0.410745 | 0.038774 | 2705.156 | 458.39 | 6.762889 | | |
| 20 | 676 | 1921 | 0.18183 | 10.85086 | 30.5 | 25.2 | 5.3 | 27.85 | 0.026218 | 29.7342 | 347.767 | 1.58E-05 | 0.0257 | 0.473007 | 0.038778 | 2705.95 | 605.42 | 6.764875 | | |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | | |

| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |
|--------|----------|--------|-------|--------|--------|
| 0.1473 | 0.000268 | 0.0001 | 4E-04 | 0.1477 | 1.5723 |
| 0.1414 | 0.00026 | 0.0001 | 4E-04 | 0.1418 | 1.9626 |
| 0.1286 | 0.000253 | 0.0001 | 4E-04 | 0.129 | 2.1457 |
| 0.1025 | 0.000248 | 0.0001 | 4E-04 | 0.103 | 1.7674 |
| 0.0943 | 0.000245 | 0.0001 | 4E-04 | 0.0948 | 1.7828 |
| 0.0918 | 0.000242 | 0.0001 | 4E-04 | 0.0924 | 2.0481 |
| 0.0895 | 0.000239 | 0.0001 | 4E-04 | 0.0901 | 2.3362 |
| 0.0895 | 0.000237 | 0.0001 | 4E-04 | 0.0901 | 2.7116 |
| 0.0813 | 0.000235 | 0.0001 | 4E-04 | 0.0819 | 2.5878 |
| 0.07 | 0.000233 | 0.0001 | 4E-04 | 0.0707 | 2.2093 |
| 0.0737 | 0.000233 | 0.0001 | 4E-04 | 0.0743 | 2.4447 |
| 0.1684 | 0.000268 | 0.0001 | 4E-04 | 0.1687 | 2.0586 |
| 0.1813 | 0.00026 | 0.0001 | 4E-04 | 0.1816 | 3.2304 |
| 0.1571 | 0.000253 | 0.0001 | 4E-04 | 0.1575 | 3.2042 |
| 0.1386 | 0.000248 | 0.0001 | 4E-04 | 0.139 | 3.1666 |
| 0.1504 | 0.000245 | 0.0001 | 4E-04 | 0.1508 | 4.5703 |
| 0.1198 | 0.000247 | 0.0001 | 4E-04 | 0.1203 | 2.6003 |
| 0.1219 | 0.000248 | 0.0001 | 4E-04 | 0.1223 | 2.5311 |
| 0.1309 | 0.000245 | 0.0001 | 4E-04 | 0.1313 | 3.4792 |
| 0.1334 | 0.000243 | 0.0001 | 4E-04 | 0.1338 | 3.9782 |
| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |

| UTavg/Tavg | U/ff | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |
|------------|---------|-------|------------|--------|--------|--------|--------|
| 0.0267841 | 0.00002 | 3E-05 | 0.0070323 | 0.0034 | 0.0075 | 0.0344 | 2.8663 |
| 0.0264831 | 0.00002 | 3E-05 | 0.0051493 | 0.0034 | 0.0075 | 0.0328 | 5.0933 |
| 0.0262375 | 0.00002 | 3E-05 | 0.0047304 | 0.0034 | 0.0075 | 0.0324 | 5.9484 |
| 0.0253896 | 0.00002 | 3E-05 | 0.004562 | 0.0034 | 0.0075 | 0.0316 | 6.2267 |
| 0.0249418 | 0.00002 | 3E-05 | 0.0041186 | 0.0034 | 0.0075 | 0.031 | 7.4836 |
| 0.0245095 | 0.00002 | 3E-05 | 0.0036738 | 0.0034 | 0.0075 | 0.0304 | 9.2197 |
| 0.0245948 | 0.00002 | 3E-05 | 0.003096 | 0.0034 | 0.0075 | 0.0302 | 12.905 |
| 0.0245948 | 0.00002 | 3E-05 | 0.0025988 | 0.0034 | 0.0075 | 0.03 | 18.201 |
| 0.0241744 | 0.00002 | 3E-05 | 0.002451 | 0.0034 | 0.0075 | 0.0296 | 20.169 |
| 0.0235308 | 0.00002 | 3E-05 | 0.0023277 | 0.0034 | 0.0075 | 0.0291 | 21.892 |
| 0.0237282 | 0.00002 | 3E-05 | 0.0021295 | 0.0034 | 0.0075 | 0.0292 | 26.264 |
| 0.0262862 | 0.00002 | 3E-05 | 0.0058005 | 0.0034 | 0.0075 | 0.0331 | 4.0455 |
| 0.0261405 | 0.00002 | 3E-05 | 0.0046685 | 0.0034 | 0.0075 | 0.0323 | 6.0839 |
| 0.0258537 | 0.00002 | 3E-05 | 0.0037793 | 0.0034 | 0.0075 | 0.0316 | 9.0741 |
| 0.0255732 | 0.00002 | 3E-05 | 0.0035162 | 0.0034 | 0.0075 | 0.0312 | 10.358 |
| 0.0257596 | 0.00002 | 3E-05 | 0.0026483 | 0.0034 | 0.0075 | 0.031 | 18.157 |
| 0.0252086 | 0.00002 | 3E-05 | 0.003655 | 0.0034 | 0.0075 | 0.031 | 9.5047 |
| 0.0251637 | 0.00002 | 3E-05 | 0.0034578 | 0.0034 | 0.0075 | 0.0308 | 10.575 |
| 0.0253441 | 0.00002 | 3E-05 | 0.0029976 | 0.0034 | 0.0075 | 0.0308 | 14.057 |
| 0.0253896 | 0.00002 | 3E-05 | 0.0026028 | 0.0034 | 0.0075 | 0.0307 | 18.583 |
| UTavg/Tavg | U/ff | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |

| S/d | | | L (m) | | | | | | | | | | | | | | | | |
|-----|--------|-----------|---------|----------|--------|-------|-----------|----------|-----------|---------|---------|-----------|--------|----------|----------|----------|--------|----------|--|
| 2 | | | 0.60000 | | | | | | | | | | | | | | | | |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Re | phi | |
| 1 | 723 | 1000 | 0.10364 | 6.18548 | 25.1 | 22.2 | 2.9 | 23.65 | 0.025911 | 17.8656 | 345.332 | 1.54E-05 | 0.0134 | 0.228611 | 0.041766 | 2966.947 | 166.06 | 7.417368 | |
| 2 | 723 | 1243 | 0.12092 | 7.21676 | 25.9 | 22.4 | 3.5 | 24.15 | 0.0259476 | 20.122 | 345.623 | 1.55E-05 | 0.0166 | 0.284403 | 0.041731 | 2958.115 | 239.27 | 7.395288 | |
| 3 | 723 | 1520 | 0.13769 | 8.21780 | 26.1 | 22.4 | 3.7 | 24.25 | 0.0259549 | 24.6741 | 345.681 | 1.55E-05 | 0.0203 | 0.34784 | 0.041724 | 2956.354 | 357.7 | 7.390885 | |
| 4 | 723 | 1654 | 0.15603 | 9.31248 | 27.2 | 22.7 | 4.5 | 24.95 | 0.0260061 | 26.0012 | 346.088 | 1.56E-05 | 0.0221 | 0.37895 | 0.041675 | 2944.074 | 422.78 | 7.360186 | |
| 5 | 723 | 1768 | 0.17211 | 10.27234 | 28.8 | 23.5 | 5.3 | 26.15 | 0.0260939 | 26.7717 | 346.783 | 1.57E-05 | 0.0236 | 0.405883 | 0.041591 | 2923.218 | 481.57 | 7.308045 | |
| 6 | 723 | 1957 | 0.18948 | 11.30900 | 29.3 | 23.7 | 5.6 | 26.5 | 0.0261195 | 30.6794 | 346.986 | 1.57E-05 | 0.0262 | 0.449535 | 0.041567 | 2917.181 | 589.51 | 7.292952 | |
| 7 | 723 | 2026 | 0.20689 | 12.34790 | 30.4 | 23.7 | 6.7 | 27.05 | 0.0261596 | 30.6233 | 347.304 | 1.57E-05 | 0.0271 | 0.465811 | 0.041529 | 2907.735 | 630.92 | 7.269338 | |
| 8 | 723 | 2092 | 0.22363 | 13.34720 | 31.6 | 23.8 | 7.8 | 27.7 | 0.026207 | 30.6787 | 347.68 | 1.58E-05 | 0.028 | 0.481506 | 0.041484 | 2896.637 | 671.58 | 7.241592 | |
| 9 | 723 | 2334 | 0.24128 | 14.40030 | 31.9 | 24 | 7.9 | 27.95 | 0.0262253 | 35.1194 | 347.825 | 1.58E-05 | 0.0312 | 0.53743 | 0.041467 | 2892.387 | 835.41 | 7.230967 | |
| 10 | 723 | 2483 | 0.25802 | 15.39930 | 33.1 | 24 | 9.1 | 28.55 | 0.026269 | 34.8071 | 348.171 | 1.59E-05 | 0.0332 | 0.572308 | 0.041426 | 2882.229 | 944.03 | 7.205572 | |
| 11 | 723 | 800 | 0.11171 | 6.66713 | 30.2 | 24 | 6.2 | 27.1 | 0.0261633 | 9.61491 | 347.333 | 1.58E-05 | 0.0107 | 0.183949 | 0.041526 | 2906.879 | 98.36 | 7.267197 | |
| 12 | 723 | 982 | 0.12911 | 7.70582 | 30.8 | 24.2 | 6.6 | 27.5 | 0.0261925 | 12.0523 | 347.565 | 1.58E-05 | 0.0131 | 0.225947 | 0.041498 | 2900.044 | 148.05 | 7.250111 | |
| 13 | 723 | 1252 | 0.14611 | 8.72031 | 30.5 | 24.3 | 6.2 | 27.4 | 0.0261852 | 16.4349 | 347.507 | 1.58E-05 | 0.0167 | 0.288024 | 0.041505 | 2901.75 | 240.72 | 7.254376 | |
| 14 | 723 | 1435 | 0.16417 | 9.79841 | 29.8 | 24.3 | 5.5 | 27.05 | 0.0261596 | 23.4136 | 347.304 | 1.57E-05 | 0.0192 | 0.329931 | 0.041529 | 2907.735 | 316.52 | 7.269338 | |
| 15 | 723 | 1675 | 0.18113 | 10.81040 | 31.1 | 24.3 | 6.8 | 27.7 | 0.026207 | 23.0095 | 347.68 | 1.58E-05 | 0.0224 | 0.385527 | 0.041484 | 2896.637 | 430.53 | 7.241592 | |
| 16 | 723 | 1703 | 0.19763 | 11.79506 | 32.3 | 24.1 | 8.2 | 28.2 | 0.0262435 | 22.6838 | 347.969 | 1.59E-05 | 0.0228 | 0.392298 | 0.04145 | 2888.147 | 444.48 | 7.220368 | |
| 17 | 723 | 1849 | 0.21572 | 12.87484 | 33.1 | 24.3 | 8.8 | 28.7 | 0.0262799 | 25.1494 | 348.258 | 1.59E-05 | 0.0247 | 0.426283 | 0.041415 | 2879.698 | 523.29 | 7.199246 | |
| 18 | 723 | 1974 | 0.23247 | 13.87483 | 33.8 | 24.3 | 9.5 | 29.05 | 0.0263054 | 27.0294 | 348.459 | 1.59E-05 | 0.0264 | 0.455365 | 0.041391 | 2873.808 | 595.91 | 7.184521 | |
| 19 | 723 | 2119 | 0.24853 | 14.83312 | 34.3 | 24.5 | 9.8 | 29.4 | 0.0263309 | 29.9174 | 348.661 | 1.6E-05 | 0.0283 | 0.489097 | 0.041367 | 2867.938 | 686.06 | 7.169846 | |
| 20 | 723 | 2160 | 0.25915 | 15.46712 | 35.1 | 24.6 | 10.5 | 29.85 | 0.0263637 | 30.3232 | 348.92 | 1.6E-05 | 0.0289 | 0.498931 | 0.041337 | 2860.42 | 712.05 | 7.15105 | |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | |

| UdT/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |
|--------|----------|--------|-------|--------|--------|
| 0.2438 | 0.000268 | 0.0001 | 4E-04 | 0.244 | 4.3598 |
| 0.202 | 0.00026 | 0.0001 | 4E-04 | 0.2023 | 4.0702 |
| 0.1911 | 0.000254 | 0.0001 | 4E-04 | 0.1914 | 4.7219 |
| 0.1571 | 0.000248 | 0.0001 | 4E-04 | 0.1575 | 4.0939 |
| 0.1334 | 0.000245 | 0.0001 | 4E-04 | 0.1338 | 3.5818 |
| 0.1263 | 0.000242 | 0.0001 | 4E-04 | 0.1267 | 3.886 |
| 0.1055 | 0.000239 | 0.0001 | 4E-04 | 0.106 | 3.2358 |
| 0.0907 | 0.000237 | 0.0001 | 4E-04 | 0.0912 | 2.7889 |
| 0.0895 | 0.000235 | 0.0001 | 4E-04 | 0.0901 | 3.163 |
| 0.0777 | 0.000233 | 0.0001 | 4E-04 | 0.0783 | 2.727 |
| 0.114 | 0.000264 | 0.0001 | 4E-04 | 0.1145 | 1.1008 |
| 0.1071 | 0.000256 | 0.0001 | 4E-04 | 0.1076 | 1.2969 |
| 0.114 | 0.000251 | 0.0001 | 4E-04 | 0.1145 | 1.8816 |
| 0.1286 | 0.000247 | 0.0001 | 4E-04 | 0.129 | 3.0193 |
| 0.104 | 0.000243 | 0.0001 | 4E-04 | 0.1045 | 2.4037 |
| 0.0862 | 0.00024 | 0.0001 | 4E-04 | 0.0868 | 1.9692 |
| 0.0804 | 0.000238 | 0.0001 | 4E-04 | 0.081 | 2.0365 |
| 0.0744 | 0.000236 | 0.0001 | 4E-04 | 0.0751 | 2.03 |
| 0.0722 | 0.000234 | 0.0001 | 4E-04 | 0.0728 | 2.1793 |
| 0.0673 | 0.000233 | 0.0001 | 4E-04 | 0.0681 | 2.0645 |
| UdT/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |

| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |
|------------|---------|-------|------------|--------|--------|--------|--------|
| 0.0298985 | 0.00002 | 3E-05 | 0.005 | 0.0034 | 0.0075 | 0.0356 | 5.5137 |
| 0.0292795 | 0.00002 | 3E-05 | 0.0040225 | 0.0034 | 0.0075 | 0.0345 | 8.2624 |
| 0.0291588 | 0.00002 | 3E-05 | 0.0032895 | 0.0034 | 0.0075 | 0.0341 | 12.204 |
| 0.0283407 | 0.00002 | 3E-05 | 0.003023 | 0.0034 | 0.0075 | 0.0333 | 14.087 |
| 0.0270402 | 0.00002 | 3E-05 | 0.0028281 | 0.0034 | 0.0075 | 0.0321 | 15.482 |
| 0.026683 | 0.00002 | 3E-05 | 0.0025549 | 0.0034 | 0.0075 | 0.0318 | 18.721 |
| 0.0261405 | 0.00002 | 3E-05 | 0.0024679 | 0.0034 | 0.0075 | 0.0313 | 19.732 |
| 0.0255271 | 0.00002 | 3E-05 | 0.0023901 | 0.0034 | 0.0075 | 0.0307 | 20.644 |
| 0.0252987 | 0.00002 | 3E-05 | 0.0021422 | 0.0034 | 0.0075 | 0.0305 | 25.461 |
| 0.0247671 | 0.00002 | 3E-05 | 0.0020137 | 0.0034 | 0.0075 | 0.03 | 28.322 |
| 0.0260923 | 0.00002 | 3E-05 | 0.00625 | 0.0034 | 0.0075 | 0.0333 | 3.2734 |
| 0.0257127 | 0.00002 | 3E-05 | 0.0050916 | 0.0034 | 0.0075 | 0.0322 | 4.7638 |
| 0.0258066 | 0.00002 | 3E-05 | 0.0039936 | 0.0034 | 0.0075 | 0.0316 | 7.6131 |
| 0.0261405 | 0.00002 | 3E-05 | 0.0034843 | 0.0034 | 0.0075 | 0.0317 | 10.021 |
| 0.0255271 | 0.00002 | 3E-05 | 0.0029851 | 0.0034 | 0.0075 | 0.0309 | 13.324 |
| 0.0250745 | 0.00002 | 3E-05 | 0.002936 | 0.0034 | 0.0075 | 0.0306 | 13.581 |
| 0.0246376 | 0.00002 | 3E-05 | 0.0027042 | 0.0034 | 0.0075 | 0.0301 | 15.757 |
| 0.0243408 | 0.00002 | 3E-05 | 0.0025329 | 0.0034 | 0.0075 | 0.0298 | 17.763 |
| 0.024051 | 0.00002 | 3E-05 | 0.0023596 | 0.0034 | 0.0075 | 0.0295 | 20.249 |
| 0.0236884 | 0.00002 | 3E-05 | 0.0023148 | 0.0034 | 0.0075 | 0.0292 | 20.797 |
| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |

| Svd | | 2 | | L (m) | | 0.65000 | | | | | | | | | | | | | | |
|-----|--------|-----------|---------|----------|--------|---------|-----------|----------|-----------|---------|---------|-----------|--------|----------|----------|----------|--------|----------|--|--|
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | | |
| 1 | 925 | 1123 | 0.10310 | 6.15347 | 27.6 | 24.1 | 3.5 | 25.85 | 0.026072 | 14.5596 | 346.61 | 1.56E-05 | 0.015 | 0.201408 | 0.053238 | 3746.581 | 151.98 | 9.366454 | | |
| 2 | 925 | 1364 | 0.12052 | 7.19309 | 28.5 | 24.3 | 4.2 | 26.4 | 0.0261121 | 16.5536 | 346.928 | 1.57E-05 | 0.0182 | 0.244856 | 0.053189 | 3734.42 | 223.9 | 9.336051 | | |
| 3 | 925 | 1577 | 0.13795 | 8.23313 | 29 | 24.4 | 4.6 | 26.7 | 0.0261341 | 19.7841 | 347.102 | 1.57E-05 | 0.0211 | 0.283234 | 0.053163 | 3727.814 | 299.05 | 9.319535 | | |
| 4 | 925 | 1697 | 0.15467 | 9.23136 | 29.8 | 24.6 | 5.2 | 27.2 | 0.0261706 | 21.9718 | 347.391 | 1.58E-05 | 0.0227 | 0.305041 | 0.053119 | 3716.847 | 345.85 | 9.292117 | | |
| 5 | 925 | 1770 | 0.17207 | 10.26994 | 31.1 | 24.6 | 6.5 | 27.85 | 0.026218 | 21.7157 | 347.767 | 1.58E-05 | 0.0237 | 0.318507 | 0.053061 | 3702.668 | 375.62 | 9.256671 | | |
| 6 | 925 | 1902 | 0.18902 | 11.28152 | 31.8 | 24.6 | 7.2 | 28.2 | 0.0262435 | 23.6337 | 347.969 | 1.59E-05 | 0.0254 | 0.342459 | 0.05303 | 3695.071 | 433.35 | 9.237677 | | |
| 7 | 925 | 1953 | 0.20620 | 12.30650 | 33.2 | 24.6 | 8.6 | 28.9 | 0.0262945 | 23.4994 | 348.373 | 1.59E-05 | 0.0261 | 0.352049 | 0.052969 | 3679.952 | 456.09 | 9.199881 | | |
| 8 | 925 | 2150 | 0.22452 | 13.40040 | 33.7 | 24.7 | 9 | 29.2 | 0.0263164 | 26.6022 | 348.546 | 1.59E-05 | 0.0287 | 0.387753 | 0.052943 | 3673.504 | 552.32 | 9.183761 | | |
| 9 | 925 | 970 | 0.09406 | 5.61365 | 29.1 | 25 | 4.1 | 27.05 | 0.0261596 | 10.3092 | 347.304 | 1.57E-05 | 0.013 | 0.174317 | 0.053132 | 3720.131 | 113.04 | 9.300329 | | |
| 10 | 925 | 856 | 0.08592 | 5.12814 | 28.7 | 25 | 3.7 | 26.85 | 0.026145 | 9.5386 | 347.189 | 1.57E-05 | 0.0114 | 0.153779 | 0.05315 | 3724.518 | 88.077 | 9.311296 | | |
| 11 | 925 | 1340 | 0.11172 | 6.66807 | 29 | 25.1 | 3.9 | 27.05 | 0.0261596 | 15.2917 | 347.304 | 1.57E-05 | 0.0179 | 0.240809 | 0.053132 | 3720.131 | 215.73 | 9.300329 | | |
| 12 | 925 | 1405 | 0.12889 | 7.69236 | 30.3 | 25.3 | 5 | 27.8 | 0.0262143 | 15.8402 | 347.738 | 1.58E-05 | 0.0188 | 0.252805 | 0.053066 | 3703.756 | 236.71 | 9.25939 | | |
| 13 | 925 | 1668 | 0.14610 | 8.71968 | 30.6 | 25.2 | 5.4 | 27.9 | 0.0262216 | 18.8408 | 347.796 | 1.58E-05 | 0.0223 | 0.300177 | 0.053057 | 3701.581 | 333.54 | 9.253954 | | |
| 14 | 925 | 1720 | 0.16282 | 9.71790 | 31.3 | 25.4 | 5.9 | 28.35 | 0.0262544 | 21.3916 | 348.056 | 1.59E-05 | 0.023 | 0.309766 | 0.053017 | 3691.822 | 354.25 | 9.229556 | | |
| 15 | 925 | 1799 | 0.17233 | 10.28507 | 32 | 25.4 | 6.6 | 28.7 | 0.0262799 | 21.3992 | 348.258 | 1.59E-05 | 0.024 | 0.324182 | 0.052966 | 3684.261 | 387.19 | 9.210654 | | |
| 16 | 925 | 1929 | 0.18158 | 10.83731 | 32.5 | 25.5 | 7 | 29 | 0.0263018 | 22.3826 | 348.431 | 1.59E-05 | 0.0258 | 0.347781 | 0.05296 | 3677.801 | 444.84 | 9.194503 | | |
| 17 | 925 | 1976 | 0.18973 | 11.32370 | 32.7 | 25.5 | 7.2 | 29.1 | 0.0263091 | 23.7514 | 348.488 | 1.59E-05 | 0.0264 | 0.356313 | 0.052951 | 3675.651 | 466.66 | 9.189129 | | |
| 18 | 925 | 2203 | 0.21596 | 12.88940 | 33.6 | 25.6 | 8 | 29.6 | 0.0263455 | 27.658 | 348.776 | 1.6E-05 | 0.0294 | 0.397575 | 0.052908 | 3664.935 | 579.3 | 9.162339 | | |
| 19 | 925 | 2052 | 0.20645 | 12.32190 | 33.8 | 25.9 | 7.9 | 29.85 | 0.0263637 | 25.5784 | 348.92 | 1.6E-05 | 0.0274 | 0.370476 | 0.052886 | 3659.597 | 502.29 | 9.148992 | | |
| 20 | 925 | 1894 | 0.19041 | 11.36410 | 34.5 | 25.7 | 8.8 | 30.1 | 0.0263819 | 19.5179 | 349.064 | 1.6E-05 | 0.0253 | 0.342092 | 0.052864 | 3654.271 | 427.65 | 9.135678 | | |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | | |

| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |
|--------|----------|--------|-------|--------|--------|
| 0.202 | 0.000268 | 0.0001 | 4E-04 | 0.2023 | 2.9451 |
| 0.1684 | 0.00026 | 0.0001 | 4E-04 | 0.1687 | 2.7918 |
| 0.1537 | 0.000253 | 0.0001 | 4E-04 | 0.154 | 3.0476 |
| 0.136 | 0.000249 | 0.0001 | 4E-04 | 0.1363 | 2.9958 |
| 0.1088 | 0.000245 | 0.0001 | 4E-04 | 0.1092 | 2.3723 |
| 0.0982 | 0.000242 | 0.0001 | 4E-04 | 0.0987 | 2.3331 |
| 0.0822 | 0.000239 | 0.0001 | 4E-04 | 0.0828 | 1.9464 |
| 0.0786 | 0.000237 | 0.0001 | 4E-04 | 0.0792 | 2.107 |
| 0.1725 | 0.000274 | 0.0001 | 4E-04 | 0.1728 | 1.781 |
| 0.1911 | 0.00028 | 0.0001 | 4E-04 | 0.1914 | 1.8254 |
| 0.1813 | 0.000264 | 0.0001 | 4E-04 | 0.1816 | 2.7767 |
| 0.1414 | 0.000257 | 0.0001 | 4E-04 | 0.1418 | 2.2457 |
| 0.1309 | 0.000251 | 0.0001 | 4E-04 | 0.1313 | 2.4743 |
| 0.1198 | 0.000247 | 0.0001 | 4E-04 | 0.1203 | 2.5727 |
| 0.1071 | 0.000245 | 0.0001 | 4E-04 | 0.1076 | 2.3026 |
| 0.101 | 0.000243 | 0.0001 | 4E-04 | 0.1015 | 2.2721 |
| 0.0982 | 0.000242 | 0.0001 | 4E-04 | 0.0987 | 2.3447 |
| 0.0884 | 0.000238 | 0.0001 | 4E-04 | 0.089 | 2.4603 |
| 0.0895 | 0.000239 | 0.0001 | 4E-04 | 0.0901 | 2.3037 |
| 0.0804 | 0.000242 | 0.0001 | 4E-04 | 0.081 | 1.5804 |
| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |

| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |
|------------|---------|-------|------------|--------|--------|--------|--------|
| 0.027354 | 0.00002 | 3E-05 | 0.0044524 | 0.0034 | 0.0075 | 0.0331 | 5.036 |
| 0.0267841 | 0.00002 | 3E-05 | 0.0036657 | 0.0034 | 0.0075 | 0.0323 | 7.2259 |
| 0.0264831 | 0.00002 | 3E-05 | 0.0031706 | 0.0034 | 0.0075 | 0.0318 | 9.5135 |
| 0.0259963 | 0.00002 | 3E-05 | 0.0029464 | 0.0034 | 0.0075 | 0.0313 | 10.832 |
| 0.0253896 | 0.00002 | 3E-05 | 0.0028249 | 0.0034 | 0.0075 | 0.0308 | 11.559 |
| 0.0250745 | 0.00002 | 3E-05 | 0.0026288 | 0.0034 | 0.0075 | 0.0304 | 13.193 |
| 0.0244671 | 0.00002 | 3E-05 | 0.0025602 | 0.0034 | 0.0075 | 0.0299 | 13.647 |
| 0.0242158 | 0.00002 | 3E-05 | 0.0023256 | 0.0034 | 0.0075 | 0.0296 | 16.37 |
| 0.0261405 | 0.00002 | 3E-05 | 0.0051546 | 0.0034 | 0.0075 | 0.0326 | 3.6804 |
| 0.0263352 | 0.00002 | 3E-05 | 0.0058411 | 0.0034 | 0.0075 | 0.0332 | 2.9218 |
| 0.0261405 | 0.00002 | 3E-05 | 0.0037313 | 0.0034 | 0.0075 | 0.0318 | 6.8541 |
| 0.0254353 | 0.00002 | 3E-05 | 0.0035587 | 0.0034 | 0.0075 | 0.0311 | 7.3648 |
| 0.0253441 | 0.00002 | 3E-05 | 0.0029976 | 0.0034 | 0.0075 | 0.0308 | 10.273 |
| 0.0249418 | 0.00002 | 3E-05 | 0.002907 | 0.0034 | 0.0075 | 0.0304 | 10.782 |
| 0.0246376 | 0.00002 | 3E-05 | 0.0027793 | 0.0034 | 0.0075 | 0.0301 | 11.67 |
| 0.0243828 | 0.00002 | 3E-05 | 0.002592 | 0.0034 | 0.0075 | 0.0299 | 13.284 |
| 0.024299 | 0.00002 | 3E-05 | 0.0025304 | 0.0034 | 0.0075 | 0.0298 | 13.894 |
| 0.0238885 | 0.00002 | 3E-05 | 0.0022696 | 0.0034 | 0.0075 | 0.0294 | 17.005 |
| 0.0236884 | 0.00002 | 3E-05 | 0.0024366 | 0.0034 | 0.0075 | 0.0292 | 14.69 |
| 0.0234917 | 0.00002 | 3E-05 | 0.0026399 | 0.0034 | 0.0075 | 0.0292 | 12.469 |
| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |

| S/d | | L (m) | | | | | | | | | | | | | | | | | |
|-----|--------|-----------|---------|---------|--------|-------|-----------|----------|-----------|---------|---------|-----------|--------|----------|----------|----------|--------|----------|--|
| 2 | | 0.65000 | | | | | | | | | | | | | | | | | |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | |
| 1 | 1202 | 1162 | 0.10288 | 6.14012 | 28.8 | 24.8 | 4 | 26.8 | 0.0261414 | 12.6508 | 347.16 | 1.57E-05 | 0.0155 | 0.160631 | 0.069071 | 4841.287 | 124.92 | 12.10322 | |
| 2 | 1202 | 1290 | 0.11157 | 6.65879 | 29.1 | 24.9 | 4.2 | 27 | 0.026156 | 14.1619 | 347.275 | 1.57E-05 | 0.0172 | 0.178385 | 0.069048 | 4835.584 | 153.87 | 12.08896 | |
| 3 | 1202 | 1455 | 0.12019 | 7.17328 | 29.4 | 25 | 4.4 | 27.2 | 0.0261706 | 15.6791 | 347.391 | 1.58E-05 | 0.0194 | 0.201269 | 0.069025 | 4829.891 | 195.65 | 12.07473 | |
| 4 | 1202 | 1532 | 0.12894 | 7.69549 | 29.7 | 25 | 4.7 | 27.35 | 0.0261815 | 16.8862 | 347.478 | 1.58E-05 | 0.0205 | 0.211973 | 0.069008 | 4825.629 | 216.83 | 12.06407 | |
| 5 | 1202 | 1633 | 0.13738 | 8.19945 | 30.2 | 25 | 5.2 | 27.6 | 0.0261997 | 17.3149 | 347.622 | 1.58E-05 | 0.0218 | 0.226042 | 0.06898 | 4818.54 | 246.2 | 12.04635 | |
| 6 | 1202 | 1703 | 0.14604 | 8.71593 | 30.6 | 25 | 5.6 | 27.8 | 0.0262143 | 18.1673 | 347.738 | 1.58E-05 | 0.0228 | 0.235809 | 0.068957 | 4812.88 | 267.63 | 12.0322 | |
| 7 | 1202 | 896 | 0.08630 | 5.15068 | 28.5 | 24.7 | 3.8 | 26.6 | 0.0261268 | 9.37586 | 347.044 | 1.57E-05 | 0.012 | 0.123819 | 0.069094 | 4847.002 | 74.31 | 12.11751 | |
| 8 | 1202 | 731 | 0.07727 | 4.61156 | 27.8 | 24.8 | 3 | 26.3 | 0.0261048 | 9.52808 | 346.87 | 1.57E-05 | 0.0098 | 0.100967 | 0.069129 | 4855.594 | 49.499 | 12.13899 | |
| 9 | 1202 | 1209 | 0.09466 | 5.64993 | 28.2 | 24.9 | 3.3 | 26.55 | 0.0261231 | 12.9927 | 347.015 | 1.57E-05 | 0.0162 | 0.167059 | 0.0691 | 4848.432 | 135.31 | 12.12108 | |
| 10 | 1202 | 1414 | 0.11209 | 6.68965 | 28.9 | 24.7 | 4.2 | 26.8 | 0.0261414 | 14.3015 | 347.16 | 1.57E-05 | 0.0189 | 0.195467 | 0.069071 | 4841.287 | 184.97 | 12.10322 | |
| 11 | 1202 | 1467 | 0.12022 | 7.17515 | 29.4 | 24.8 | 4.6 | 27.1 | 0.0261633 | 15.0094 | 347.333 | 1.58E-05 | 0.0196 | 0.202895 | 0.069037 | 4832.736 | 198.95 | 12.08184 | |
| 12 | 1202 | 1635 | 0.12903 | 7.70113 | 29.4 | 24.9 | 4.5 | 27.15 | 0.0261669 | 17.6724 | 347.362 | 1.58E-05 | 0.0219 | 0.226149 | 0.069031 | 4831.313 | 247.09 | 12.07828 | |
| 13 | 1202 | 1843 | 0.13745 | 8.20358 | 29.4 | 24.9 | 4.5 | 27.15 | 0.0261669 | 20.0536 | 347.362 | 1.58E-05 | 0.0246 | 0.254919 | 0.069031 | 4831.313 | 313.96 | 12.07828 | |
| 14 | 1202 | 1377 | 0.13745 | 8.20352 | 31.3 | 25.1 | 6.2 | 28.2 | 0.0262435 | 14.5124 | 347.969 | 1.59E-05 | 0.0184 | 0.190796 | 0.068911 | 4801.594 | 174.79 | 12.00399 | |
| 15 | 1202 | 1209 | 0.12877 | 7.68528 | 31.6 | 24.8 | 6.8 | 28.2 | 0.0262435 | 11.6129 | 347.969 | 1.59E-05 | 0.0162 | 0.167518 | 0.068911 | 4801.594 | 134.74 | 12.00399 | |
| 16 | 1202 | 1049 | 0.12110 | 7.22751 | 31.7 | 24.7 | 7 | 28.2 | 0.0262435 | 9.9772 | 347.969 | 1.59E-05 | 0.014 | 0.145348 | 0.068911 | 4801.594 | 101.44 | 12.00399 | |
| 17 | 1202 | 885 | 0.11159 | 6.66036 | 31.4 | 24.7 | 6.7 | 28.05 | 0.0262326 | 8.85586 | 347.882 | 1.58E-05 | 0.0118 | 0.122594 | 0.068928 | 4805.822 | 72.228 | 12.01455 | |
| 18 | 1202 | 625 | 0.10297 | 6.14551 | 30.7 | 24.7 | 6 | 27.7 | 0.026207 | 8.42748 | 347.68 | 1.58E-05 | 0.0084 | 0.086528 | 0.068968 | 4815.709 | 36.055 | 12.03927 | |
| 19 | 1202 | 1240 | 0.11544 | 6.88965 | 30.2 | 24.8 | 5.4 | 27.5 | 0.0261925 | 11.7754 | 347.565 | 1.58E-05 | 0.0166 | 0.171614 | 0.068991 | 4821.373 | 142 | 12.05343 | |
| 20 | 1202 | 1392 | 0.13304 | 7.94011 | 30.7 | 24.9 | 5.8 | 27.8 | 0.0262143 | 14.5491 | 347.738 | 1.58E-05 | 0.0186 | 0.192746 | 0.068957 | 4812.88 | 178.8 | 12.0322 | |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | |

| Ud/T/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |
|--------|----------|--------|-------|--------|--------|
| 0.1768 | 0.000268 | 0.0001 | 4E-04 | 0.1771 | 2.2399 |
| 0.1684 | 0.000264 | 0.0001 | 4E-04 | 0.1687 | 2.3885 |
| 0.1607 | 0.00026 | 0.0001 | 4E-04 | 0.161 | 2.5246 |
| 0.1504 | 0.000257 | 0.0001 | 4E-04 | 0.1508 | 2.5461 |
| 0.136 | 0.000254 | 0.0001 | 4E-04 | 0.1363 | 2.3609 |
| 0.1263 | 0.000251 | 0.0001 | 4E-04 | 0.1267 | 2.2999 |
| 0.1861 | 0.00028 | 0.0001 | 4E-04 | 0.1863 | 1.7472 |
| 0.2357 | 0.000288 | 0.0001 | 4E-04 | 0.2359 | 2.2478 |
| 0.2143 | 0.000273 | 0.0001 | 4E-04 | 0.2145 | 2.787 |
| 0.1684 | 0.000264 | 0.0001 | 4E-04 | 0.1687 | 2.412 |
| 0.1537 | 0.00026 | 0.0001 | 4E-04 | 0.154 | 2.3121 |
| 0.1571 | 0.000256 | 0.0001 | 4E-04 | 0.1575 | 2.7826 |
| 0.1571 | 0.000254 | 0.0001 | 4E-04 | 0.1575 | 3.1575 |
| 0.114 | 0.000254 | 0.0001 | 4E-04 | 0.1145 | 1.6615 |
| 0.104 | 0.000257 | 0.0001 | 4E-04 | 0.1045 | 1.2132 |
| 0.101 | 0.00026 | 0.0001 | 4E-04 | 0.1015 | 1.0128 |
| 0.1055 | 0.000264 | 0.0001 | 4E-04 | 0.106 | 0.9388 |
| 0.1179 | 0.000268 | 0.0001 | 4E-04 | 0.1183 | 0.9968 |
| 0.1309 | 0.000262 | 0.0001 | 4E-04 | 0.1313 | 1.5464 |
| 0.1219 | 0.000255 | 0.0001 | 4E-04 | 0.1223 | 1.7797 |
| Ud/T/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |

| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |
|------------|---------|-------|------------|--------|--------|--------|--------|
| 0.0263843 | 0.00002 | 3E-05 | 0.0043029 | 0.0034 | 0.0075 | 0.0323 | 4.0297 |
| 0.0261889 | 0.00002 | 3E-05 | 0.003876 | 0.0034 | 0.0075 | 0.0319 | 4.9057 |
| 0.0259963 | 0.00002 | 3E-05 | 0.0034364 | 0.0034 | 0.0075 | 0.0315 | 6.167 |
| 0.0258537 | 0.00002 | 3E-05 | 0.0032637 | 0.0034 | 0.0075 | 0.0313 | 6.7929 |
| 0.0256196 | 0.00002 | 3E-05 | 0.0030618 | 0.0034 | 0.0075 | 0.0311 | 7.6454 |
| 0.0254353 | 0.00002 | 3E-05 | 0.002936 | 0.0034 | 0.0075 | 0.0309 | 8.2569 |
| 0.0265827 | 0.00002 | 3E-05 | 0.0055804 | 0.0034 | 0.0075 | 0.0332 | 2.4664 |
| 0.0268859 | 0.00002 | 3E-05 | 0.0068399 | 0.0034 | 0.0075 | 0.0344 | 1.7007 |
| 0.0266328 | 0.00002 | 3E-05 | 0.0041356 | 0.0034 | 0.0075 | 0.0324 | 4.3808 |
| 0.0263843 | 0.00002 | 3E-05 | 0.0035361 | 0.0034 | 0.0075 | 0.0319 | 5.8977 |
| 0.0260923 | 0.00002 | 3E-05 | 0.0034083 | 0.0034 | 0.0075 | 0.0316 | 6.284 |
| 0.0260442 | 0.00002 | 3E-05 | 0.0030581 | 0.0034 | 0.0075 | 0.0314 | 7.7594 |
| 0.0260442 | 0.00002 | 3E-05 | 0.002713 | 0.0034 | 0.0075 | 0.0313 | 9.8193 |
| 0.0250745 | 0.00002 | 3E-05 | 0.0036311 | 0.0034 | 0.0075 | 0.0309 | 5.3929 |
| 0.0250745 | 0.00002 | 3E-05 | 0.0041356 | 0.0034 | 0.0075 | 0.0311 | 4.1913 |
| 0.0250745 | 0.00002 | 3E-05 | 0.0047664 | 0.0034 | 0.0075 | 0.0315 | 3.1918 |
| 0.0252086 | 0.00002 | 3E-05 | 0.0056497 | 0.0034 | 0.0075 | 0.0321 | 2.3221 |
| 0.0255271 | 0.00002 | 3E-05 | 0.008 | 0.0034 | 0.0075 | 0.0343 | 1.2375 |
| 0.0257127 | 0.00002 | 3E-05 | 0.0040323 | 0.0034 | 0.0075 | 0.0316 | 4.4827 |
| 0.0254353 | 0.00002 | 3E-05 | 0.003592 | 0.0034 | 0.0075 | 0.0311 | 5.566 |
| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |

| S/d | 2 | L (m) | | | 0.65000 | | | | | | | | | | | | | | |
|-----|--------|-----------|---------|---------|---------|-------|-----------|----------|-----------|---------|---------|-----------|--------|----------|----------|----------|--------|----------|--|
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | |
| 1 | 1461 | 597 | 0.06907 | 4.12209 | 27.2 | 24.7 | 2.5 | 25.95 | 0.0260793 | 9.1443 | 346.668 | 1.56E-05 | 0.008 | 0.067801 | 0.084074 | 5914.073 | 27.187 | 14.78518 | |
| 2 | 1461 | 948 | 0.08578 | 5.11959 | 28.3 | 25 | 3.3 | 26.65 | 0.0261304 | 10.665 | 347.073 | 1.57E-05 | 0.0127 | 0.10779 | 0.083976 | 5889.668 | 68.43 | 14.72417 | |
| 3 | 1461 | 1013 | 0.10297 | 6.14534 | 29.9 | 25.3 | 4.6 | 27.6 | 0.0261997 | 10.9948 | 347.622 | 1.58E-05 | 0.0135 | 0.115363 | 0.083843 | 5856.811 | 77.946 | 14.64203 | |
| 4 | 1461 | 1109 | 0.11178 | 6.67151 | 30.7 | 25.2 | 5.5 | 27.95 | 0.0262253 | 10.8272 | 347.825 | 1.58E-05 | 0.0148 | 0.126369 | 0.083794 | 5844.782 | 93.336 | 14.61195 | |
| 5 | 1461 | 1293 | 0.12015 | 7.17098 | 30.8 | 25.5 | 5.3 | 28.15 | 0.0262399 | 12.9739 | 347.94 | 1.59E-05 | 0.0173 | 0.147384 | 0.083766 | 5837.926 | 126.81 | 14.59482 | |
| 6 | 1461 | 506 | 0.07291 | 4.35139 | 28.5 | 25.5 | 3 | 27 | 0.026156 | 8.46672 | 347.275 | 1.57E-05 | 0.0068 | 0.057567 | 0.083927 | 5877.527 | 19.478 | 14.69382 | |
| 7 | 1461 | 651 | 0.08149 | 4.86391 | 29.1 | 25.7 | 3.4 | 27.4 | 0.0261852 | 9.32369 | 347.507 | 1.58E-05 | 0.0087 | 0.074113 | 0.083871 | 5863.703 | 32.208 | 14.65926 | |
| 8 | 1461 | 827 | 0.08985 | 5.36244 | 29.5 | 25.7 | 3.8 | 27.6 | 0.0261997 | 10.1343 | 347.622 | 1.58E-05 | 0.0111 | 0.094181 | 0.083843 | 5856.811 | 51.95 | 14.64203 | |
| 9 | 1461 | 840 | 0.09459 | 5.64554 | 30.1 | 25.7 | 4.4 | 27.9 | 0.0262216 | 9.69281 | 347.796 | 1.58E-05 | 0.0112 | 0.095709 | 0.083801 | 5846.497 | 53.555 | 14.61624 | |
| 10 | 1461 | 884 | 0.09889 | 5.90238 | 30.5 | 25.7 | 4.8 | 28.1 | 0.0262362 | 9.70651 | 347.911 | 1.58E-05 | 0.0118 | 0.100756 | 0.083773 | 5839.639 | 59.282 | 14.5991 | |
| 11 | 1461 | 1017 | 0.11581 | 6.91176 | 31.9 | 25.8 | 6.1 | 28.85 | 0.0262909 | 10.4519 | 348.344 | 1.59E-05 | 0.0136 | 0.116059 | 0.083669 | 5814.036 | 78.313 | 14.53509 | |
| 12 | 1461 | 1121 | 0.12642 | 7.54502 | 32.7 | 25.8 | 6.9 | 29.25 | 0.02632 | 10.9986 | 348.575 | 1.6E-05 | 0.015 | 0.128012 | 0.083614 | 5800.456 | 95.052 | 14.50114 | |
| 13 | 1461 | 1242 | 0.13305 | 7.94086 | 33.3 | 25.7 | 7.6 | 29.5 | 0.0263382 | 11.0532 | 348.719 | 1.6E-05 | 0.0166 | 0.141888 | 0.083579 | 5791.995 | 116.61 | 14.47999 | |
| 14 | 1461 | 1290 | 0.13735 | 8.19759 | 33.6 | 25.9 | 7.7 | 29.75 | 0.0263564 | 11.6184 | 348.863 | 1.6E-05 | 0.0172 | 0.147432 | 0.083545 | 5783.555 | 125.71 | 14.45889 | |
| 15 | 1461 | 756 | 0.07855 | 4.68841 | 28.2 | 25.4 | 2.8 | 26.8 | 0.0261414 | 10.537 | 347.16 | 1.57E-05 | 0.0101 | 0.08598 | 0.083955 | 5884.46 | 43.502 | 14.71115 | |
| 16 | 1461 | 1062 | 0.09482 | 5.65942 | 29 | 25.4 | 3.6 | 27.2 | 0.0261706 | 11.9283 | 347.391 | 1.58E-05 | 0.0142 | 0.120863 | 0.083899 | 5870.608 | 85.766 | 14.67652 | |
| 17 | 1461 | 996 | 0.10229 | 6.10531 | 29.9 | 25.4 | 4.5 | 27.65 | 0.0262034 | 11.0917 | 347.651 | 1.58E-05 | 0.0133 | 0.113436 | 0.083836 | 5855.09 | 75.342 | 14.63773 | |
| 18 | 1461 | 1142 | 0.11654 | 6.95545 | 31 | 25.4 | 5.6 | 28.2 | 0.0262435 | 11.6503 | 347.969 | 1.59E-05 | 0.0153 | 0.130183 | 0.083759 | 5836.214 | 98.91 | 14.59054 | |
| 19 | 1461 | 1104 | 0.12382 | 7.39018 | 32.3 | 25.6 | 6.7 | 28.95 | 0.0262982 | 10.8758 | 348.402 | 1.59E-05 | 0.0148 | 0.126008 | 0.083655 | 5810.636 | 92.261 | 14.52659 | |
| 20 | 1461 | 1198 | 0.13606 | 8.12083 | 32.9 | 25.5 | 7.4 | 29.2 | 0.0263164 | 11.8821 | 348.546 | 1.59E-05 | 0.016 | 0.136793 | 0.083621 | 5802.151 | 108.57 | 14.50538 | |
| # | f (Hz) | Vmic (mV) | VR (V) | VH (V) | TH (C) | TA(C) | deltaT(C) | Tavg (C) | k(W/mK) | Nu | c (m/s) | v (m^2/s) | PR | epsilon | X | Λ^2 | Rs | phi | |

| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |
|--------|----------|--------|-------|--------|--------|
| 0.2828 | 0.000297 | 0.0001 | 4E-04 | 0.283 | 2.588 |
| 0.2143 | 0.00028 | 0.0001 | 4E-04 | 0.2145 | 2.2877 |
| 0.1537 | 0.000268 | 0.0001 | 4E-04 | 0.154 | 1.6937 |
| 0.1286 | 0.000264 | 0.0001 | 4E-04 | 0.129 | 1.3962 |
| 0.1334 | 0.00026 | 0.0001 | 4E-04 | 0.1338 | 1.7358 |
| 0.2357 | 0.000292 | 0.0001 | 4E-04 | 0.2359 | 1.9974 |
| 0.208 | 0.000284 | 0.0001 | 4E-04 | 0.2082 | 1.9413 |
| 0.1861 | 0.000277 | 0.0001 | 4E-04 | 0.1863 | 1.8885 |
| 0.1607 | 0.000273 | 0.0001 | 4E-04 | 0.161 | 1.5607 |
| 0.1473 | 0.000271 | 0.0001 | 4E-04 | 0.1477 | 1.4332 |
| 0.1159 | 0.000262 | 0.0001 | 4E-04 | 0.1164 | 1.2161 |
| 0.1025 | 0.000257 | 0.0001 | 4E-04 | 0.103 | 1.1325 |
| 0.093 | 0.000255 | 0.0001 | 4E-04 | 0.0936 | 1.0343 |
| 0.0918 | 0.000254 | 0.0001 | 4E-04 | 0.0924 | 1.0733 |
| 0.2525 | 0.000286 | 0.0001 | 4E-04 | 0.2527 | 2.6631 |
| 0.1964 | 0.000273 | 0.0001 | 4E-04 | 0.1967 | 2.346 |
| 0.1571 | 0.000269 | 0.0001 | 4E-04 | 0.1575 | 1.7464 |
| 0.1263 | 0.000261 | 0.0001 | 4E-04 | 0.1267 | 1.463 |
| 0.1055 | 0.000258 | 0.0001 | 4E-04 | 0.106 | 1.153 |
| 0.0956 | 0.000254 | 0.0001 | 4E-04 | 0.0961 | 1.1416 |
| Ud/T | UVR/VR | UVH/VH | Uk/k | UNu/Nu | UNu |

| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |
|------------|---------|-------|------------|--------|--------|--------|--------|
| 0.0272486 | 0.00002 | 3E-05 | 0.0083752 | 0.0034 | 0.0075 | 0.036 | 0.9778 |
| 0.0265328 | 0.00002 | 3E-05 | 0.0052743 | 0.0034 | 0.0075 | 0.033 | 2.2548 |
| 0.0256196 | 0.00002 | 3E-05 | 0.0049358 | 0.0034 | 0.0075 | 0.032 | 2.4946 |
| 0.0252987 | 0.00002 | 3E-05 | 0.0045086 | 0.0034 | 0.0075 | 0.0315 | 2.9394 |
| 0.025119 | 0.00002 | 3E-05 | 0.003867 | 0.0034 | 0.0075 | 0.031 | 3.9316 |
| 0.0261889 | 0.00002 | 3E-05 | 0.0098814 | 0.0034 | 0.0075 | 0.0367 | 0.7148 |
| 0.0258066 | 0.00002 | 3E-05 | 0.0076805 | 0.0034 | 0.0075 | 0.0342 | 1.1028 |
| 0.0256196 | 0.00002 | 3E-05 | 0.0060459 | 0.0034 | 0.0075 | 0.0328 | 1.7017 |
| 0.0253441 | 0.00002 | 3E-05 | 0.0059524 | 0.0034 | 0.0075 | 0.0325 | 1.7391 |
| 0.0251637 | 0.00002 | 3E-05 | 0.0056561 | 0.0034 | 0.0075 | 0.0321 | 1.9041 |
| 0.0245095 | 0.00002 | 3E-05 | 0.0049164 | 0.0034 | 0.0075 | 0.0311 | 2.4363 |
| 0.0241744 | 0.00002 | 3E-05 | 0.0044603 | 0.0034 | 0.0075 | 0.0306 | 2.9056 |
| 0.0239695 | 0.00002 | 3E-05 | 0.0040258 | 0.0034 | 0.0075 | 0.0302 | 3.5172 |
| 0.0237681 | 0.00002 | 3E-05 | 0.003876 | 0.0034 | 0.0075 | 0.0299 | 3.7619 |
| 0.0263843 | 0.00002 | 3E-05 | 0.0066138 | 0.0034 | 0.0075 | 0.0338 | 1.4698 |
| 0.0259963 | 0.00002 | 3E-05 | 0.0047081 | 0.0034 | 0.0075 | 0.0322 | 2.7588 |
| 0.0255732 | 0.00002 | 3E-05 | 0.0050201 | 0.0034 | 0.0075 | 0.032 | 2.4124 |
| 0.0250745 | 0.00002 | 3E-05 | 0.0043783 | 0.0034 | 0.0075 | 0.0312 | 3.0898 |
| 0.0244249 | 0.00002 | 3E-05 | 0.004529 | 0.0034 | 0.0075 | 0.0308 | 2.8423 |
| 0.0242158 | 0.00002 | 3E-05 | 0.0041736 | 0.0034 | 0.0075 | 0.0304 | 3.3048 |
| UTavg/Tavg | Uf/f | Uv/v | Uvmic/Vmic | UG/G | US/S | URs/Rs | URs |

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